

Tigard Senior Center Renovation and Addition

8815 SW O'Mara Street
Tigard, Oregon

PROJECT MANUAL

PROJECT NO. 207037

September 17, 2007



City of Tigard
13125 SW Hall Blvd.
Tigard, Oregon 97223

LRS Architects, Inc.
720 SW Davis Street, Suite 300
Portland, Oregon 97209
503-221-1121

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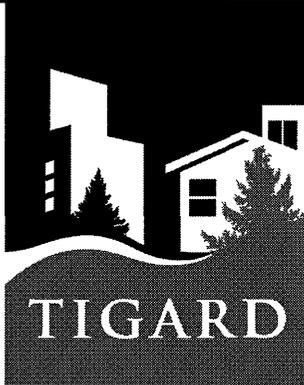
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CITY OF TIGARD, OREGON

INVITATION TO BID

TIGARD SENIOR CENTER RENOVATION AND ADDITION

DATE DUE: Tuesday, October 9, 2007
TIME DUE: 2:00 PM

Envelopes must be sealed and marked with ITB Title.
Bidders must submit one (1) original and three (3) copies of their Bid.

If a bid exceeds \$100,000, Respondents must submit a First Tier Subcontractor Disclosure Form to the City no later than 4:00 PM, Tuesday, October 9, 2007.

A mandatory pre-bid walkthrough/meeting will be held at 2:00 PM, Thursday, September 27, 2007 at the City of Tigard Senior Center Building located at 8815 SW O' Mara, Tigard, Oregon 97223.

PROJECT MANAGER:	ITB QUESTIONS:
Daniel Plaza, Parks and Facilities Manager City of Tigard, Public Works Phone: (503) 718-2590 Fax: (503) 684-7297 Email: daniel@tigard-or.gov	Joe Barrett, Buyer City of Tigard, Financial & Information Services Phone: (503) 718-2477 Fax: (503) 684-7297 Email: joseph@tigard-or.gov

SUBMIT BIDS TO:
Joe Barrett, Buyer
City of Tigard – Information Desk
13125 SW Hall Blvd.
Tigard, Oregon 97223

**PUBLIC NOTICE
INVITATION TO BID
TIGARD SENIOR CENTER
RENOVATION AND ADDITION**

The City of Tigard is requesting sealed bids from firms qualified to provide an construction services to the City for facility upgrades to Tigard's Senior Center. Firms are invited to submit a sealed bid for the requested services as outlined in the City's Invitation to Bid packet. A mandatory pre-bid walkthrough and meeting will be held at 2:00 PM Pacific Daylight Time (PDT), Thursday, September 27, 2007 at the City of Tigard Senior Center located at 8815 SW O' Mara Street, Tigard, Oregon 97223. Any firm wishing to bid on the project must be represented at the pre-bid walkthrough or their bid will be deemed nonresponsive.

Sealed bids will be received by Joe Barrett, Buyer at Tigard City Hall's Information Desk located at 13125 SW Hall Blvd., Tigard, Oregon 97223 no later than 2:00 PM PST on Tuesday, October 9, 2007 with public opening to immediately follow. If a bid is submitted for an amount exceeding \$100,000, the Bidder shall submit a First Tier Subcontractor Disclosure Form included in the Bid Packet to the City no later than 4:00 PM PST on Tuesday, October 9, 2007 to the attention of Joe Barrett, Buyer, at the Tigard City Hall Information Desk. A ten percent bid security must accompany a firm's bid.

Facsimile and electronic (email) bids will not be accepted. Bids will not be accepted after the stated opening date and time and late bids will be returned to the vendor unopened. The City intends to enter into a contract with the successful Bidder to provide the required services.

Bid packets may be downloaded from <http://www.tigard-or.gov>, obtained from Precision Images by calling (503) 274-2030, or by calling Joe Barrett, Buyer at (503) 718-2477. Bids must be submitted on the bid form provided in the bid package.

No bid will be received or considered by the City unless the bid contains, or is accompanied by, a statement that the provisions contained in ORS 279C.840 and ORS 279C.845 pertaining to prevailing wages shall be met. All bidders are required to certify that they have (or will have) a drug-testing program in place at the time of execution of a contract with the successful bidder and will continue the program for the duration of the contract.

The City may reject any bid not in compliance with all prescribed public bidding procedures and requirements, and may reject for good cause any or all bids upon a finding of the City if it is in the public interest to do so.

Published: Daily Journal of Commerce
Date: September 18, 2007
Published: The Oregonian
Date: September 18, 2007

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SECTION 1
INTRODUCTION

The City of Tigard is requesting sealed bids from firms qualified to provide an construction services to the City for facility upgrades to Tigard's Senior Center. Firms are invited to submit a sealed bid for the requested services as outlined in the City's Invitation to Bid packet. A mandatory pre-bid walkthrough and meeting will be held at 2:00 PM Pacific Daylight Time (PDT), Thursday, September 27, 2007 at the City of Tigard Senior Center located at 8815 SW O' Mara Street, Tigard, Oregon 97223. Any firm wishing to bid on the project must be represented at the pre-bid walkthrough or their bid will be deemed nonresponsive.

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The City may reject any bid not in compliance with all prescribed public bidding procedures and requirements, and may reject for good cause any or all bids upon a finding of the City if it is in the public interest to do so.

SECTION 2
BID PREPARATION

1. EXECUTION OF BID

Bids must be typewritten or prepared in ink. Bids shall be submitted on the "Bid Form" furnished by the City and must be signed in ink by an authorized representative of the bidder.

2. CONFORMANCE TO BID REQUIREMENTS

Bids must conform to the requirements of the Invitation to bid, which are hereby made a part of this contract. All requested attachments (references, descriptive literature, etc.) must be submitted with the bid and in the required format. Bid prices must be for the unit indicated on the bid. Failure to comply with all requirements may result in bid rejection.

3. BID MODIFICATION

Modifications or erasures made before bid submission must be initialed in ink by the person the person signing the bid. Bids once submitted may be modified in writing before the time and date set for bid closing. Any modifications shall be prepared on company letterhead, signed by an authorized representative, and state that the new document supersedes or modifies the prior bid. Modification must be submitted in a sealed envelope clearly marked "Bid Modification" and identify the bid and closing date. Bidders may not modify bids after bid closing time.

4. **BID WITHDRAWALS**

Bids may be withdrawn in writing on company letterhead signed by an authorized representative and received by the Purchasing Division or in person upon presentation of appropriate identification prior to bid closing time. Unopened bids withdrawn may be released to the bidder after voiding any date and time stamp used. Requests to withdraw mailed bids shall be marked "Bid Withdrawal" and shall clearly state bid title.

5. **PROTEST OF SPECIFICATIONS OR TERMS**

A bidder who believes any specifications or terms detailed in the bid packet or sample contract (Attachment E) are unnecessarily restrictive or limit competition may submit a protest in writing, to the Purchasing Office. A protest may be submitted via facsimile. Any such protest shall include the reasons for the protest and shall detail any proposed changes to the specifications or terms. The Purchasing Office shall respond to any protest and, if necessary, shall issue any appropriate revisions, substitutions, or clarification via addenda to all interested Bidders.

To be considered, protests must be received at least five- (5) days before the bid closing date. The City shall not consider any protest against award due to the content of bid specifications or contract terms submitted after the established protest deadline. All protests should be directed to Joe Barrett, Buyer and be marked as follows:

ITB Specification/Term Protest

Bid Name and Closing Date

City of Tigard

Attn: Joe Barrett, Buyer

13125 SW Hall Blvd.

Tigard, Oregon 97223

If a bid protest is received in accordance with section above, the bid opening date may be extended if necessary to allow consideration of the protest and issuance of any necessary addenda to the bid documents.

6. **ADDENDUM**

The City may modify the ITB by issuance of an "Addendum" to all prospective bidders within a reasonable time prior to bid closing to allow bidders to consider them in preparing their bids, but in no case less than 72 hours before the bid closing. If an Addendum is necessary after that time, the City, at its discretion, can extend the closing date.

Any Addendum issued, as a result of any change in the RFP, must be acknowledged by submitting the "Acknowledgment of Addendum" (Attachment B) with a proposal. Only questions that are answered by formal written addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7. **RECYCLABLE PRODUCTS**

Bidders shall use recyclable products to the maximum extent economically feasible in the performance of the contract set forth in this document.

8. **CITY'S PROJECT MANAGER**

The City's Project Manager for this work will be Rob Murchison, Project Engineer, who can be reached by phone at (503) 718-2699 or by email at robm@tigard-or.gov.

SECTION 3
BID SUBMISSION AND OPENING

1. SUBMISSION

One (1) original and three (3) copies of the sealed Bid must be received before the stated closing time at the address listed below. To assure that your bid receives priority treatment, please mark as follows.

Tigard Senior Center
Renovation and Addition
Due: October 9, 2007
City of Tigard – Information Desk
Attn: Joe Barrett, Buyer
13125 SW Hall Blvd.
Tigard, Oregon 97223

Bidders shall include their firm name and address on the outside of the envelope. It is the bidder's responsibility to ensure that bids are received prior to the stated closing time. The City shall not be responsible for the proper identification and handling of any bids submitted incorrectly. Late bids, late modification, or late withdrawals will not be accepted after the stated bid opening date and time and will be returned unopened. Facsimile and electronic (email) bids will not be accepted.

2. BID OPENING

Bids will be opened 2:00 PM on Tuesday, October 9, 2007 in the Tigard City Hall's Conference Room. Bidders may be present; however, award decisions will not be made at the opening.

3. FIRST TIER SUBCONTRACTOR DISCLOSURE

If a bid exceeds \$100,000, Bidders must submit a First Tier Subcontractor Disclosure Form, provided in this packet at Exhibit D, to the City no later than 4:00 PM, Tuesday, October 9, 2007.

4. BID SECURITY

Pursuant to Tigard Public Contracting Rule 30.055, all bidders must submit a bid security to the City along with their bid in an amount equal to ten percent (10%) of their base bid. The bid must be in one of the following forms:

- A. Surety bond from surety company authorized to do business in the State of Oregon; or
- B. Cashier's check, certified check, or savings and loan secured check.

A Bidders bid security shall be forfeited if the Bidder fails to execute the contract promptly and properly if so awarded. The bid security of all unsuccessful bidders shall be returned after a contract has been executed or all bids have been rejected.

SECTION 4
GENERAL INFORMATION

1. DEFINITIONS

For the purpose of these specifications, the following definitions shall apply:

- A. City shall mean City of Tigard;
- B. Contractor shall mean the lowest responsive and responsible bidder awarded the contract;

- C. **Contract or Contract Documents** the written agreement between the City and Contractor which includes the Purchase Order, Invitation to Bid, any Addenda issued, describing the work to be done and the obligations of the parties.

2. **CONTRACT**

After the award, the Contractor and the City will enter into a public improvement contract incorporating the terms and conditions of the ITB document and the bid response. **Vendors taking exception to any of the contract terms shall submit a protest or request for change in accordance with Section 2.5 "Protest of Specifications or Terms" or their exceptions will be deemed waived.**

3. **ANTICIPATED TERM OF CONTRACT**

The Contract period shall begin on or around November 14, 2007 and end on or around January 15, 2008 with Substantial Completion achieved by December 31, 2007. This timeframe may be revised slightly prior to contract execution. In accordance with Tigard Public Contracting Rules the total duration of the Contract may not exceed five (5) years.

4. **CONTRACT PRICING ADJUSTMENTS**

Prices shall remain firm through the initial term of the subsequent Contract, with the following exceptions:

- A. City shall be given immediate benefit of any price decreases.
- B. Contractor shall promptly notify the City of amount and effective date of any decreases.
- C. Any decrease shall apply to any work requested on or after the effective date of decrease.

The City may consider a price increase for any Contract extension if the increased pricing remains advantageous to the City. Pricing increases must be received at the City at least forty-five (45) days prior to any extension of the Contract. Contractor shall provide documentation for price increase; failure to provide sufficient documentation shall result in rejection of increases. The City reserves the right to accept or reject any increases. In case of errors in pricing, unit prices shall govern.

5. **BUSINESS TAX AND FEDERAL ID NO. REQUIRED**

The City of Tigard Business Tax is required from successful Bidder. Chapter 5.4 of the Tigard Municipal Code states any business doing business in the City of Tigard shall pay a City of Tigard Business Tax. No contracts shall be signed prior to the obtaining of the City of Tigard Business Tax. Upon award of proposal, contractor shall complete a Federal W-9, Request for Taxpayer Identification Number and Certification Form for the City.

6. **RESIDENT BIDDER**

ORS 279C.365(h) requires every bidder on a public improvement contract to indicate whether they are a resident bidder as defined in ORS 279A.120. A resident bidder means a bidder that has paid unemployment taxes or income taxes in this state during the 12 calendar months immediately preceding submission of the bid and has a business address in the State of Oregon. This City requires all Bidders, regardless of the form of the subsequent contract, to indicate if they are a resident bidder or not (see Attachment C.) As a public contracting agency, the City shall prefer goods or services that have been manufactured or produced in this state if price, fitness, availability and quality are otherwise equal.

8. **PUBLIC RECORDS**

All bid material submitted by bidder shall become the property of the City and is public record unless otherwise specified. A bid that contains any information that is considered trade secret under ORS 192.501(2) should be segregated and clearly identified as such. This information will be kept confidential and shall not be disclosed except in accordance with the Oregon Public Records Law, ORS 192. The above restrictions may not include cost or price information, which must be open to public inspection.

9. **BILLING REQUIREMENTS**

Invoices shall be sent to City of Tigard, Attn: Accounts Payable, 13125 SW Hall Blvd., Tigard, Oregon 97223. Payment terms shall be a net 30 following the date the invoice is received.

10. **TERMINATION OF CONTRACT**

Contract may be terminated by mutual consent of both parties or by the City at its discretion with a 30 days' written notice. The City may cancel an order for goods at any time with written notice to Contractor, stating the extent and effective date of termination. If the contract is so terminated, Contractor shall be paid in accordance with the terms of the contract for goods delivered and accepted to the date of termination which cannot be mitigated by resale as provided in the Uniform Commercial Code (ORS 72.7060).

11. **PREVAILING WAGE**

The provisions of ORS Chapters 279A and 279C and all other Oregon and Federal provisions pertaining to minimum salaries and wages shall be incorporated by reference as if fully set forth in any contract resulting from this Invitation to Bid. The successful bidder shall agree that the workmen in each trade or occupation required for the work to be done pursuant to the resulting contract, employed in the performance of the resulting contract, either by the successful bidder or any subcontractor or other person doing or contracting to do any part of the work contemplated by the Contractor shall be paid not less than the prevailing, minimum hourly rate of wage specified by the Commissioner of the Bureau of Labor, and attached hereto.

For contracts \$50,000 or greater, the Contractor shall pay a fee equal to one-tenth of one percent (.001) of the price of the contract. The fee shall be paid on or before the first progress payment or 60 days from the date work first began on the contract, whichever comes first. The fee is payable to the Bureau of Labor and Industries and shall be mailed or otherwise delivered to the Bureau at the following address:

Bureau of Labor and Industries
Wage and Hours Division
Prevailing Wage Unit
800 NE Oregon Street, # 32
Portland, Oregon 97232

Contractor shall provide proof to the City prior to the beginning of any of the work that the Contractor has filed a public works bond with a corporate surety in the amount of \$30,000 with the Construction Contractors Board as required under Oregon PWR law.

SECTION 5
BID EVALUATION AND AWARD

1. BID VALIDITY TIMEFRAME

All bids submitted shall be valid and binding for **sixty (60) calendar days** from bid closing date, unless extended by mutual consent of all parties.

2. EVALUATION CRITERIA

Bids will be awarded based upon the evaluation criteria detailed in the Invitation to Bid. Ordinarily, bids will be evaluated to identify the “lowest responsive and responsible bidder” who has substantially complied with all requirements and specifications of the ITB and who can be expected to deliver promptly and perform reliably.

3. RECIPROCAL PREFERENCE

In determining the “lowest responsible bidder,” the City shall add a percent increase to each out-of-state bidder’s bid price which is equal to the percent given to local bidders in that bidder’s home state. This is pursuant to ORS 279A.120(2)(b).

4. DELIVERY DELAYS

Significant delays in delivery may be considered in determining award if early delivery is required.

5. METHOD OF AWARD

The City reserves the right to make the award by item, groups of items or entire bid, whichever is in the best interest of the City.

6. ERRORS IN BIDS

When an error(s) is made in extending total prices, the unit bid price will govern. Bidders are cautioned to recheck their bid for possible error(s). Error(s) discovered after opening cannot be corrected and the contractor will be required to perform if their bid is accepted.

7. BID REJECTION

The City may reject any bid not in compliance with all prescribed public bidding procedures and requirements and may reject for good cause any or all bids upon a finding of the City that it is in the public interest to do so.

8. MINOR INFORMALITIES

The City reserves the right to waive any and all minor informalities that may arise in relation to this bid process.

SECTION 6
SPECIAL BID INSTRUCTIONS

1. TIME TABLE

Tuesday, September 18, 2007

Tuesday, October 9, 2007 at 2:00 PM

Tuesday, October 9, 2007 at 4:00 PM

Tuesday, October 23, 2007

Wednesday, October 24, 2007

Tuesday, January 15th, 2008

Public Notice & Invitation to Bid Release

ITB Closing Date & Time

1st Tier Subcontractor Disclosure Due

Award of Contract by Local Contract Review Board

Contract Commencement Date

Substantial Completion

2. **REQUESTED INFORMATION**

Please include a cover letter which includes a brief corporate history, how long in business, number of employees, when registered to do business in Oregon, etc.

3. **BIDDERS QUALIFICATIONS AND REFERENCES**

All bidders must fully complete and submit the "Bidder Qualifications and Reference Form" on page 16-17 of this ITB. Bidders must include at least three (3) references will be considered for this project. Failure to provide complete the information may be cause for bid rejection.

4. **CONTRACTOR CONTACTS**

Contractor shall designate one (1) primary and one (1) backup person responsible for the contractor's work under this contract. Contractor shall provide to City the names, addresses and telephone numbers, including after hours/emergency numbers of such persons and shall keep this information current with the City Contract Administrator at all times.

5. **CONSORTIUMS / PARTNERSHIPS / SUBCONTRACTORS**

The City will not consider bids submitted by a consortium, or by multiple firms submitting as partners or joint ventures. Bidders shall not consider the use of sub-contractors for this bid proposal. Contractor must have sufficient resources to perform all services required by this contract. The City reserves the right to approve the use of sub-contractors during the term of this contract as special circumstances dictate.

6. **NON-COLLUSION AFFIDAVIT**

Bidder certifies that this bid/proposal has been arrived at independently and has been submitted without collusion designed to limit independent bidding or competition.

7. **BILLING METHOD**

Each invoice shall include adequate detail to identify each good or service purchased. At a minimum this detail shall include:

- A. Total number of man hours for the billing period;
- B. Detailed pricing and specification for any goods purchased;
- C. Details regarding the status of the project, i.e. completion percentage, revised estimated time of completion, etc.; and
- D. Payment due date.

8. **QUANTITIES**

The City does not bind itself to purchase the full quantities stipulated in the proposal as estimates. The quantities shown as estimates are not exact. They represent past purchasing activity and estimates of future usage and are given for comparing bids on a uniform basis. Payment shall be made only for quantities ordered, delivered and accepted, whether greater or less than the stated amounts. Quantities listed on proposal are based on a one-year estimate.

SECTION 7
DETAILED SPECIFICATIONS

Work shall include, but shall not be limited to the following:

Tenant improvement renovations as indicated in the Drawings and as specified in the Project Manual.

**ATTACHMENT A
CITY OF TIGARD
TIGARD SENIOR CENTER
RENOVATION AND ADDITION
BID FORM**

The Bidder, whose legal signature binding the Bidder to the bid prices indicated on these pages, hereby bids as

follows: **Base Bid** \$ _____

Bidders Signature

Print Corporate Name of Bidding Firm: _____

Print Bidder Rep. Name and Title: _____

Bidder Representative Signature: _____

The following schedule of bid prices is for Owner's reference only. This pricing will not be used in determining bid award. Minor discrepancies between this pricing and bid noted above or Attachment 'D' will not constitute a non-responsive bid.

DIVISION	DESCRIPTION OF ITEM/SERVICE	TOTAL PRICE
DIVISION 01	GENERAL REQUIREMENTS	
DIVISION 02	EXISTING CONDITIONS	
DIVISION 03	CONCRETE	
DIVISION 05	METALS	
DIVISION 06	WOOD, PLASTICS, AND COMPOSITES	
DIVISION 07	THERMAL AND MOISTURE PROTECTION	
DIVISION 08	DOORS AND WINDOWS	
DIVISION 09	FINISHES	
DIVISION 10	SPECIALTIES	
DIVISION 11	EQUIPMENT	
DIVISION 12	FURNISHINGS	
DIVISION 21	FIRE SUPPRESSION	
DIVISION 22	PLUMBING	
DIVISION 23	HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)	

DIVISION 26	ELECTRICAL	
DIVISION 27	COMMUNICATIONS	
DIVISION 28	ELECTRONIC SAFETY AND SECURITY	
DIVISION 31	EARTHWORK	
DIVISION 32	EXTERIOR IMPROVEMENTS	
DIVISION 33	UTILITIES	

NOTE - If a bid requires more table space to list pricing detail, Bidder is to submit information on additional copy of this form.

**ATTACHMENT B
ACKNOWLEDGMENT OF ADDENDA
CITY OF TIGARD, OREGON
INVITATION TO BID
TIGARD SENIOR CENTER
RENOVATION AND ADDITION
CLOSE: TUESDAY, OCTOBER 9, 2007, 2:00 PM**

I/WE HAVE RECEIVED THE FOLLOWING ADDENDA:

If none received, write "None Received"

1. _____ 3. _____

2. _____ 4. _____

Date

Signature of Proposer

Title

Corporate Name

**ATTACHMENT C
BID CERTIFICATIONS**

Non-discrimination Clause

The Contractor agrees not to discriminate against any client, employee or applicant for employment or for services, because of race, color, religion, sex, national origin, handicap or age with regard to, but not limited to, the following: employment upgrading, demotion or transfer; recruitment or recruitment advertising; layoffs or termination; rates of pay or other forms of compensation; selection for training; rendition of services. It is further understood that any contractor who is in violation of this clause shall be barred from receiving awards of any purchase order or contract from the City, unless a satisfactory showing is made that discriminatory practices have terminated and that a recurrence of such acts is unlikely.

Agreed by: _____

Firm Name: _____

Address: _____

Resident Certificate

Please Check One:

Resident Vendor: Vendor has paid unemployment taxes and income taxes in this state during the last twelve calendar months immediately preceding the submission of this proposal.

Or

Non-resident Vendor: Vendor does not qualify under requirement stated above.
(Please specify your state of residence: _____)

Officer's signature: _____

Type or print officer's name: _____

**ATTACHMENT D
CITY OF TIGARD
INVITATION TO BID
FIRST TIER SUBCONTRACTOR DISCLOSURE FORM**

PROJECT NAME: _____

BID #: _____ **BID CLOSING: Date:** _____ **Time:** _____

This form must be submitted at the location specified in the Invitation to Bid on the advertised bid closing date and within two working hours after the advertised bid closing time.

List below the name of each subcontractor that will be furnishing labor or will be furnishing labor and materials in connection with the public improvement and that is required to be disclosed, the category of work that the subcontractor will be performing and the dollar value of the subcontract. Enter "None" if there are no subcontractors that need to be disclosed. *(Attach additional sheets if they are needed).*

	<u>NAME</u>	<u>DOLLAR VALUE</u>	<u>CATEGORY OF WORK</u>
1)	_____	\$ _____	_____
2)	_____	\$ _____	_____
3)	_____	\$ _____	_____
4)	_____	\$ _____	_____

Failure to submit this form by the disclosure deadline will result in a nonresponsive bid. A nonresponsive bid will not be considered for award.

Form submitted by (Bidder's name): _____

Contact Individual: _____ **Phone #:** _____

**ATTACHMENT E
CITY OF TIGARD, OREGON
PUBLIC IMPROVEMENT CONTRACT
(PROJECT TITLE)**

THIS CONTRACT, made and entered into this (Day) day of (Month), (Year), by and between the City of Tigard, a municipal corporation of the State of Oregon, hereinafter called "City" and (Full Name & Address of Firm or Individual) hereinafter called "Contractor", duly authorized to perform such services in Oregon.

RECITALS

WHEREAS, the City requires services which Contractor is capable of providing, under terms and conditions hereinafter described; and

WHEREAS, time is of the essence in this contract and all work under this contract shall be completed within the time period stated in the Bid Proposal;

TERMS OF AGREEMENT

THEREFORE, in consideration of the promises and covenants contained herein, the parties hereby agree as follows:

1. Services

Contractor's services under this Agreement shall consist of the following:

(Enter General Description of the Work and Include Sentences that Incorporate all Attached Documents (i.e. Detailed Scope of Work, Contractor's Bid, etc.)

2. Prevailing Wage

The provisions of ORS Chapters 279A and 279C and all other Oregon and Federal provisions pertaining to minimum salaries and wages are incorporated herein by reference as if fully set forth. The Contractor agrees that the workmen in each trade or occupation required for the work to be done pursuant to the contract, employed in the performance of the Contract, either by the Contractor or Subcontractor or other person doing or contracting to do any part of the work contemplated by the Contractor shall be paid not less than the prevailing, minimum hourly rate of wage specified by the Commissioner of the Bureau of Labor, and attached hereto.

For contracts \$50,000 or greater, the Contractor shall pay a fee equal to one-tenth of one percent (.001) of the price of the contract. The fee shall be paid on or before the first progress payment or 60 days from the date work first began on the contract, whichever comes first. The fee is payable to the Bureau of Labor and Industries and shall be mailed or otherwise delivered to the Bureau at the following address:

Bureau of Labor and Industries
Wage and Hours Division
Prevailing Wage Unit
800 NE Oregon Street, # 32
Portland, Oregon 97232

Contractor shall provide proof to the City prior to the beginning of any of the work that the Contractor has filed a public works bond with a corporate surety in the amount of \$30,000 with the Construction Contractors Board as required under Oregon PWR law.

3. Contract Documents

The Contractor is hereby bound to comply with all requirements of this agreement, the Contractor's proposal, the detailed specifications and requirements, the drawings, and the special conditions and modifications in conditions as set forth in the documents prepared by the City Engineer and the performance pertaining to this contract, in the City of Tigard, Oregon, and by this reference made a part hereof to the same legal force and effect as if set forth herein in full.

4. City's Representative

For purposes hereof, the City's authorized representative will be the City Engineer, 13125 SW Hall Blvd., Tigard, Oregon 97223; Telephone: 639-4171.

5. Contractor's Representative

For purpose hereof, the Contractor's authorized representative will be (Enter Representative's Name).

6. Contractor Identification

Contractor shall furnish to the City the Contractor's employer identification number, as designated by the Internal Revenue Service, or Contractor's social security number, as City deems applicable.

7. Compensation

A. Progress Payments: City agrees to pay Contractor (Enter amount in written form) Dollars (\$Enter amount in numerical form) for performance of those services provided hereunder, which payment shall be based upon the following applicable terms:

Payment shall be based upon the unit prices bid by the Contractor, as listed in attached proposal. Contractor shall prepare and submit each month to the City Engineer, 13125 SW Hall Blvd., Tigard, Oregon 97223, a statement of services rendered, (indicating the description of each service used in the proposal and the dollar amount of each service completed through the stated date), together with a request for payment duly verified by the Contractor's Representative.

Payment by the City shall release the City from any further obligation for payment to Contractor for services performed or expenses incurred as of the date of the statement of services. Payment of installments shall not be considered acceptance or approval of any work or waiver of any defects therein. City certifies that sufficient funds are available and authorized for expenditure to finance costs of this contract.

Contractor shall include proof of payment to any and all subcontractors and suppliers with each statement submitted to the City. The City shall retain the right to withhold payments if required proof of payment to subcontractor and suppliers is not included with a statement.

As required under State of Oregon Prevailing Wage Rate (PWR) Law, the City shall withhold 25% of any progress payment amounts owed to Contractor if Contractor has failed to file certified payrolls sheets with the City

- B. Timing of Payments:** Progress payments, less a five percent retainage as authorized by ORS 279C.555, shall be made to the Contractor within twenty (20) days of the City's receipt of the statement of services. The Contractor agrees that the "Time of Completion" is defined in the Bid Proposal, and agrees to complete the work by said date. The Contractor and City agree that the City will suffer damages each day the work remains uncompleted after the Time of Completion and that the amounts of those damages are difficult to calculate. Contractor and City agree that a reasonable amount of damages for late completion is \$ _____ per day and Contractor agrees to pay damages in that amount if the work is not completed by the Time of Completion.
- C. Final Payment:** The Contractor shall notify the City in writing when the Contractor considers the project complete, and the City shall, within 15 days after receiving the written notice, either accept the work or notify the Contractor of work yet to be performed on the contract.

Upon acceptance by the City, the entire balance due to the Contractor, including the retained percentage, shall be paid to the Contractor, by the City within 30 days after the date of said final acceptance.

The City shall pay to the Contractor interest at the rate of one and one-half percent per month on the final payment due the Contractor, to commence 30 days after the work under the Contract has been completed and accepted and to run until the date when final payment is tendered to the Contractor. If the City does not, within 15 days after receiving written notice of completion, notify the Contractor of work yet to be performed to fulfill contractual obligations, the interest provided by this subsection shall commence to run 30 days after the end of the 15-day period.

As a further conditions of final acceptance, the City may require the Contractor to submit evidence, satisfactory to the City's Representative, that all payrolls, material bills, and other indebtedness connected with the project have been paid, except that in case of any disputed indebtedness or liens, the Contractor may submit in lieu of evidence of payment, a surety bond satisfactory to the City guaranteeing payment of all such disputed amounts when adjudicated in cases where such payment has not already been guaranteed by surety bond.

8. Status Of Contractor As Independent Contractor

Contractor certifies that:

- A.** Contractor acknowledges that for all purposes related to this Agreement, Contractor is and shall be deemed to be an independent Contractor as defined by ORS 670.600 and not an employee of City, shall not be entitled to benefits of any kind to which an employee of City is entitled and shall be solely responsible for all payments and taxes required by law. Furthermore, in the event that Contractor is found by a court of law or any administrative agency to be an employee of City for any purpose, City shall be entitled to offset compensation due, or to demand repayment of any amounts paid to Contractor under the terms of this Agreement, to the full extent of any benefits or other remuneration Contractor receives (from City or third party) as a result of said finding and to the full extent of any payments that City is required to make (to Contractor or to a third party) as a result of said finding.

- B. The undersigned Contractor hereby represents that no employee of the City, or any partnership or corporation in which a City employee has an interest, has or will receive any remuneration of any description from Contractor, either directly or indirectly, in connection with the letting or performance of this Agreement, except as specifically declared in writing.
- C. If this payment is to be charged against Federal funds, Contractor certifies that he or she is not currently employed by the Federal Government and the amount charged does not exceed his or her normal charge for the type of service provided.
- D. Contractor and its employees, if any, are not active members of the Oregon Public Employees Retirement System and are not employed for a total of 600 hours or more in the calendar year by any public employer participating in the Retirement System.
- E. Contractor certifies that it currently has a City business license or will obtain one prior to delivering services under this Agreement.
- F. Contractor is not an officer, employee, or agent of the City as those terms are used in ORS 30.265.

9. Subcontracts - Assignment & Delegation

Contractor shall submit a list of Subcontractors for approval by the City, and Contractor shall be fully responsible for the acts or omissions of any Subcontractors and of all persons employed by them, and neither the approval by City of any Subcontractor nor anything contained herein shall be deemed to create any contractual relation between the Subcontractor and City.

This agreement, and all of the covenants and conditions hereof, shall inure to the benefit of and be binding upon the City and the Contractor respectively and their legal representatives. Contractor shall not assign any rights nor delegate any duties incurred by this contract, or any part hereof without the written consent of City, and any assignment or delegation in violation hereof shall be void.

Any and all subcontracts issued by the contractor shall contain a provision that workers shall be paid not less than the PWR Law specified minimum wage.

10. Contractor - Payment of Benefits - Hours of Work

- A. The Contractor shall:
 - 1) Make payment promptly, as due, to all persons supplying to such Contractor labor or material for the prosecution of the work provided for in this contract;
 - 2) Pay all contributions or amounts due under the Industrial Accident Fund from the Contractor or subcontractor incurred in the performance of this Agreement;
 - 3) Pay to the Department of Revenue all sums withheld from employees pursuant to ORS 316.167.
 - 4) Not permit any lien or claim to be filed or prosecuted against the City of Tigard, on account of any labor or material furnished;

- B.** The Contractor or the Contractor's Surety and every Subcontractor or the Subcontractor's Surety shall file certified statements with the City in writing in form prescribed by the Commissioner of the Bureau of Labor and Industries, certifying the hourly rate of wage paid each worker which the Contractor or the Subcontractor has employed upon such public work, and further certifying that no worker employed upon such public work has been paid less than the prevailing rate of wage, which certificate and statement shall be verified by the oath of the Contractor or the Contractor's Surety or Subcontractor or the Subcontractor's Surety that the Contractor or Subcontractor has read such statement and certificate and knows the contents thereof and that the same is true to the Contractor's or Subcontractor's knowledge.
- 1) The certified statements shall set out accurately and completely the payroll records for the prior week, including the name and address of each worker, the worker's correct classification, rate of pay, daily and weekly number of hours worked, deductions made and actual wages paid.
 - 2) Each certified statement required herein shall be delivered or mailed by the Contractor or Subcontractor to the City. A true copy of the certified statements shall also be filed at the same time with the Commissioner of the Bureau of Labor and Industries. Certified statements shall be submitted as follows:
 - a) For any project 90 days or less from the date of the award of the contract to the date of completion of work under the contract, the statements shall be submitted once before the first payment is made, and once before final payment is made of any sum due on account of the contract.
 - b) For any project exceeding 90 days from the date of the award of the contract to the date of completion of work under contract, the statements shall be submitted once before the first payment is made, at 90 day intervals thereafter, and once before final payment is made of any sum due on account of the contract.
 - c) Each Contractor or Subcontractor shall preserve certified statements for a period of three years from the date of completion of the contract.
- C.** The Contractor agrees that if the Contractor fails, neglects or refuses to make prompt payment of any claim for labor or services furnished to the Contractor or a Subcontractor by any person in connection with this contract as such claim becomes due, the proper office of the City of Tigard may pay such claim to the person furnishing the labor or services and charge the amount of the payment against funds due or to become due to the Contractor by reason of such contract. Payment of a claim in this manner shall not relieve the Contractor or the Contractor's Surety from obligation with respect to any unpaid claims.
- D.** Contractor agrees that no person shall be employed for more than eight (8) hours in any one day, or forty (40) hours in any one week, except in cases of necessity, emergency or where the City of Tigard absolutely requires it, and in such cases the laborer shall be paid at least time and a half pay for all overtime in excess of eight (8) hours a day and for work performed on Saturday and on any legal holiday as specified in ORS 279C.540.

- E. No City employee shall be required to work overtime or on a Saturday, Sunday or holiday in the fulfillment of this contract except where the Contractor agrees to reimburse the City in the amount of money paid the employee for such work as determined by state law, the City's personnel rules or union agreement. The Contractor shall require every Subcontractor to comply with this requirement.
- F. If Contractor or any first-tier subcontractor fails to pay a person furnishing labor or material within 30 days after receipt of payment from the City or from the Contractor to a subcontractor, the Contractor or first-tier subcontractor shall owe the person the amount due plus interest commencing at the end of the 10 day period that the payment is due under ORS 279C.580, unless payment is subject to a good-faith dispute. The interest rate shall be as specified in ORS 279C.505(2). If the Contractor or any subcontractor fails, neglects, or refuses to pay a person furnishing labor or material, the person may file a complaint with the Construction Contractors Board, unless the payment is subject to a good faith dispute as defined in ORS 279C.580.
- G. Contractor shall include a clause in each contract with a subcontractor a requirement that the contractor pay the subcontractor for satisfactory performance within 10 days of receipt of payment from the City for the work. Contractor shall include in contracts with subcontractors an interest provision for such payments in compliance with ORS 279C.580. Contractor shall include a clause in each contract with a subcontractor requiring the subcontractor to meet the same payment and interest standards as required by ORS 279C.580 (4).

11. Drug Testing Program

ORS 279C.505 requires that all public improvement contracts contain a provision requiring contractors to demonstrate that an employee drug-testing program is in place. The Contractor demonstrates that a drug-testing program is in place by signing of the contract. The drug testing program will apply to all employees and will be maintained for the duration of the Contract awarded. Failure to maintain a program shall constitute a material breach of contract.

12. Contractor's Employee Medical Payments

Contractor agrees to pay promptly as due, to any person, co-partnership, association or corporation furnishing medical, surgical, and hospital care or other needed care and attention incident to sickness or injury to the Contractor's employees, all sums which the Contractor agreed to pay for such services and all money and sums which the Contractor collected or deducted from employee wages pursuant to any law, contract or agreement for providing or paying for such service.

13. Early Termination

- A. This agreement may be terminated without cause prior to the expiration of the agreed upon term by mutual written consent of the parties and for the following reasons:
 - 1) If work under the Contract is suspended by an order of a public agency for any reason considered to be in the public interest other than by a labor dispute or by reason of any third party judicial proceeding relating to the work other than a suit or action filed in regard to a labor dispute; or
 - 2) If the circumstances or conditions are such that it is impracticable within a reasonable time to proceed with a substantial portion of the Contract.

- B. Payment of Contractor shall be as provided by ORS 279C.660 and shall be prorated to and include the day of termination and shall be in full satisfaction of all claims by Contractor against City under this Agreement.
- C. Termination under any provision of this paragraph shall not affect any right, obligation, or liability of Contractor or City which accrued prior to such termination.

14. Cancellation with Cause

- A. City may terminate this Agreement effective upon delivery of written notice to Contractor, or at such later date as may be established by City, under any of the following conditions:
 - 1) If City funding from federal, state, local, or other sources is not obtained and continued at levels sufficient to allow for the purchase of the indicated quantity of services. This Agreement may be modified to accommodate a reduction in funds,
 - 2) If Federal or State regulations or guidelines are modified, changed, or interpreted in such a way that the services are no longer allowable or appropriate for purchase under this Agreement,
 - 3) If any license or certificate required by law or regulation to be held by Contractor, its subcontractors, agents, and employees to provide the services required by this Agreement is for any reason denied, revoked, or not renewed, or
 - 4) If Contractor becomes insolvent, if voluntary or involuntary petition in bankruptcy is filed by or against Contractor, if a receiver or trustee is appointed for Contractor, or if there is an assignment for the benefit of creditors of Contractor.

Any such termination of this agreement under paragraph (a) shall be without prejudice to any obligations or liabilities of either party already accrued prior to such termination.

- B. City, by written notice of default (including breach of contract) to Contractor, may terminate the whole or any part of this Agreement:
 - 1) If Contractor fails to provide services called for by this agreement within the time specified herein or any extension thereof, or
 - 2) If Contractor fails to perform any of the other provisions of this Agreement, or so fails to pursue the work as to endanger performance of this agreement in accordance with its terms, and after receipt of written notice from City, fails to correct such failures within ten (10) days or such other period as City may authorize.

The rights and remedies of City provided in the above clause related to defaults (including breach of contract) by Contractor shall not be exclusive and are in addition to any other rights and remedies provided by law or under this Agreement.

If City terminates this Agreement under paragraph (b), Contractor shall be entitled to receive as full payment for all services satisfactorily rendered and expenses incurred, an amount which bears the same ratio to the total fees specified in this Agreement as the services satisfactorily rendered by Contractor bear to the total services otherwise required to be performed for such total fee; provided, that there shall be deducted from such amount the amount of damages, if any, sustained by City due to breach of contract by Contractor. Damages for breach of contract shall be those allowed by Oregon law, reasonable and necessary attorney fees, and other costs of litigation at trial and upon appeal.³

15. Access to Records

City shall have access to such book, documents, papers and records of Contractor as are directly pertinent to this Agreement for the purpose of making audit, examination, excerpts, and transcripts.

16. Work is Property of City

All work performed by Contractor under this Agreement shall be the property of the City.

17. Adherence to Law

A. Contractor shall adhere to all applicable laws governing its relationship with its employees, including but not limited to laws, rules, regulations, and policies concerning workers' compensation, and minimum and prevailing wage requirements.

B. To the extent applicable, the Contractor represents that it will comply with Executive Order 11246 as amended, Executive Order 11141, Section 503 of the Vocational Rehabilitation Act of 1973 as amended and the Age Discrimination Act of 1975, and all rules and regulations issued pursuant to the Acts.

C. As provided by ORS 279C.525, all applicable provisions of federal, state or local statutes, ordinances and regulations dealing with the prevention of environmental pollution and the preservation of natural resources that affect the work under this contract are by reference incorporated herein to the same force and affect as if set forth herein in full. If the Contractor must undertake additional work due to the enactment of new or the amendment of existing statutes, ordinances or regulations occurring after the submission of the successful bid, the City shall issue a Change Order setting forth the additional work that must be undertaken. The Change Order shall not invalidate the Contract and there shall be, in addition to a reasonable extension, if necessary, of the contract time, a reasonable adjustment in the contract price, if necessary, to compensate the Contractor for all costs and expenses incurred, including overhead and profits, as a result of the delay or additional work.

18. Changes

City may at any time, and without notice, issue a written Change Order requiring additional work within the general scope of this Contract, or any amendment thereto, or directing the omission of or variation in work. If such Change Order results in a material change in the amount or character of the work, an equitable adjustment in the Contract price and other provisions of this Contract as may be affected may be made. Any claim by Contractor for an adjustment under this section shall be asserted in writing within thirty (30) days from the date of receipt by Contractor of the notification of change or the claim will not be allowed. Whether made pursuant to this section or by mutual agreement, no change shall be binding upon City until a Change Order is executed by the Authorized Representative of City, which expressly states that it constitutes a Change Order to this Contract. The issuance of information, advice, approvals, or instructions by City's Representative or other City personnel shall not constitute an authorized change pursuant to this section. Nothing contained in this section shall excuse the Contractor from proceeding with the prosecution of the work in accordance with the Contract, as changed.

19. Force Majeure

Neither City nor Contractor shall be considered in default because of any delays in completion of responsibilities hereunder due to causes beyond the control and without fault or negligence on the part of the party so disabled, including, but not restricted to, an act of God or of a public enemy, volcano, earthquake, fire, flood, epidemic, quarantine, restriction, area-wide strike, freight embargo, unusually severe weather or delay of Subcontractor or suppliers due to such cause; provided that the party so disabled shall within ten (10) days from the beginning of such delay, notify the other party in writing of the causes of delay and its probable extent. Such notification shall not be the basis for a claim for additional compensation. Each party shall, however, make all reasonable efforts to remove or eliminate such a cause of delay or default and shall, upon cessation of the cause, diligently pursue performance of its obligation under Contract.

20. Nonwaiver

The failure of the City to insist upon or enforce strict performance by Contractor of any of the terms of this contract or to exercise any rights hereunder shall not be construed as a waiver or relinquishment to any extent of its right to assert or rely upon such terms or rights on any future occasion.

21. Warranties

All work shall be guaranteed by the Contractor for a period of one year after the date of final acceptance of the work by the Owner. Contractor warrants that all practices and procedures, workmanship, and materials shall be the best available unless otherwise specified in the profession. Neither acceptance of the work nor payment therefore shall relieve Contractor from liability under warranties contained in or implied by this contract.

22. Attorney's Fees

In case suit or action is instituted to enforce the provisions of this contract, the parties agree that the losing party shall pay such sum as the Court may adjudge reasonable attorney's fees and court costs including attorney's fees and court costs on appeal.

23. Governing Law

The provisions of this Agreement shall be construed in accordance with the provisions of the laws of the State of Oregon. Any action or suits involving any questions arising under this Agreement must be brought in the appropriate court of the State of Oregon.

24. Conflict Between Terms

It is further expressly agreed by and between the parties hereto that should there be any conflict between the terms of this instrument and the proposal of the Contractor, this instrument shall control and nothing herein shall be considered as an acceptance of the said terms of said proposal conflicting herewith.

25. Indemnification

Contractor warrants that all its work will be performed in accordance with generally accepted professional practices and standards as well as the requirements of applicable federal, state and local laws, it being understood that acceptance of a contractor's work by City shall not operate as a waiver or release.

Contractor agrees to indemnify and defend the City, its officers, agents and employees and hold them harmless from any and all liability, causes of action, claims, losses, damages, judgments or other costs or expenses including attorney's fees and witness costs and (at both trial and appeal level, whether or not a trial or appeal ever takes place) that may be asserted by any person or entity which in any way arise from, during or in connection with the performance of the work described in this contract, except liability arising out of the negligence of the City and its employees. If any aspect of this indemnity shall be found to be illegal or invalid for any reason whatsoever, such illegality or invalidity shall not affect the validity of the remainder of this indemnification.

26. Insurance

Contractor and its subcontractors shall maintain insurance acceptable to City in full force and effect throughout the term of this contract. Such insurance shall cover all risks arising directly or indirectly out of Contractor's activities or work hereunder, including the operations of its subcontractors of any tier. Such insurance shall include provisions that such insurance is primary insurance with respect to the interests of City and that any other insurance maintained by City is excess and not contributory insurance with the insurance required hereunder.

The policy or policies of insurance maintained by the Contractor and its subcontractor shall provide at least the following limits and coverages:

- A. Commercial General Liability Insurance: Contractor shall obtain, at contractor's expense, and keep in effect during the term of this contract, Comprehensive General Liability Insurance covering Bodily Injury and Property Damage on an "occurrence" form (1996 ISO or equivalent). This coverage shall include Contractual Liability insurance for the indemnity provided under this contract. The following insurance will be carried:

<u>Coverage</u>	<u>Limit</u>
General Aggregate	\$2,000,000
Products-Completed Operations Aggregate	\$1,000,000
Personal & Advertising Injury	\$1,000,000
Each Occurrence	\$1,000,000
Fire Damage (Any one fire)	\$50,000
Medical Expense (Any one person)	\$5,000

- B. Commercial Automobile Insurance: Contractor shall also obtain, at contractor's expense, and keep in effect during the term of the contract, "Symbol 1" Commercial Automobile Liability coverage including coverage for all owned, hired, and non-owned vehicles. The Combined Single Limit per occurrence shall not be less than \$1,000,000.

- C. Workers' Compensation Insurance: The Contractor, its subcontractors, if any, and all employers providing work, labor or materials under this Contract are subject employers under the Oregon Workers' Compensation Law and shall comply with ORS 656.017, which requires them to provide workers' compensation coverage that satisfies Oregon law for all their subject workers. Out-of-state employers must provide Oregon workers' compensation coverage for their workers who work at a single location within Oregon for more than 30 days in a calendar year. Contractors who perform work without the assistance or labor of any employee need not to obtain such coverage." This shall include Employer's Liability Insurance with coverage limits of not less than \$100,000 each accident.
- D. Additional Insured Provision: The City of Tigard, Oregon, its officers, directors, and employees shall be added as additional insureds with respect to this contract. All Liability Insurance policies will be endorsed to show this additional coverage.
- E. Notice of Cancellation: There shall be no cancellation, material change, exhaustion of aggregate limits or intent not to renew insurance coverage without 30 days written notice to the City. Any failure to comply with this provision will not affect the insurance coverage provided to the City. The 30 days notice of cancellation provision shall be physically endorsed on to the policy.
- F. Insurance Carrier Rating: Coverage provided by the Contractor must be underwritten by an insurance company deemed acceptable by the City. The City reserves the right to reject all or any insurance carrier(s) with an unacceptable financial rating.
- G. Certificates of Insurance: As evidence of the insurance coverage required by the contract, the contractor shall furnish a Certificate of Insurance to the City. No contract shall be effected until the required certificates have been received and approved by the City. The certificate will specify and document all provisions within this contract. A renewal certificate will be sent to the above address 10 days prior to coverage expiration.
- H. Independent Contractor Status: The service or services to be rendered under this contract are those of an independent contractor. Contractor is not an officer, employee or agent of the City as those terms are used in ORS 30.265.
- I. Primary Coverage Clarification: All parties to this contract hereby agree that the contractor's coverage will be primary in the event of a loss.

- J. Cross-Liability Clause: A cross-liability clause or separation of insureds clause will be included in all general liability, professional liability, pollution and errors and omissions policies required by this contract.

Contractor's insurance policy shall contain provisions that such policies shall not be canceled or their limits of liability reduced without thirty (30) days prior notice to City. A copy of each insurance policy, certified as a true copy by an authorized representative of the issuing insurance company, or at the discretion of City, in lieu thereof, a certificate in form satisfactory to City certifying to the issuance of such insurance shall be forwarded to:

City of Tigard
 Attn: Joe Barrett, Buyer
 13125 SW Hall Blvd.
 Tigard, Oregon 97223

Such policies or certificates must be delivered prior to commencement of the work. Ten days cancellation notice shall be provided City by certified mail to the name at the address listed above in event of cancellation or non-renewal of the insurance.

The procuring of such required insurance shall not be construed to limit contractor's liability hereunder. Notwithstanding said insurance, Contractor shall be obligated for the total amount of any damage, injury, or loss caused by negligence or neglect connected with this contract.

27. Method and Place of Giving Notice, Submitting Bills and Making Payments

All notices, bills and payments shall be made in writing and may be given by personal delivery or by mail. Notices, bills and payments sent by mail should be addressed as follows:

City of Tigard	(Contractor's Firm Name):
Attn: (name & title of person letting contract)	Attn: (insert contract manager's name)
13125 SW Hall Blvd., Tigard, Oregon 97223	Address: (insert contract manager's address)
Phone: 503-639-4171 ext. (insert #)	Phone: (insert #)
Fax: (insert #)	Fax: (insert #)
Email Address: (insert address)	Email Address: (insert address)

and when so addressed, shall be deemed given upon deposit in the United States mail, postage prepaid. In all other instances, notices, bills and payments shall be deemed given at the time of actual delivery. Changes may be made in the names and addresses of the person to whom notices, bills and payments are to be given by giving written notice pursuant to this paragraph.

28. Hazardous Materials

Contractor shall supply City with a list of any and all hazardous substances used in performance of this Agreement. That list shall identify the location of storage and use of all such hazardous substances and identify the amounts stored and used at each location. Contractor shall provide City with material safety data sheets for all hazardous substances brought onto City property, created on City property or delivered to City pursuant to this Agreement. For the purpose of this section, "hazardous substance" means hazardous substance as defined by ORS 453.307(4). Contractor shall complete the State Fire Marshall's hazardous substance survey as required by ORS 453.317 and shall assist City to complete any such survey that it may be required to complete because of substances used in the performance of this Agreement.

29. Hazardous Waste

If, as a result of performance of this Agreement, Contractor generates any hazardous wastes, Contractor shall be responsible for disposal of any such hazardous wastes in compliance with all applicable federal and state requirements. Contractors shall provide City with documentation, including all required manifests, demonstrating proper transportation and disposal of any such hazardous wastes. Contractor shall defend, indemnify, and hold harmless City for any disposal or storage of hazardous wastes generated pursuant to this Contract and any releases or discharges of hazardous materials.

30. Severability

In the event any provision or portion of this Agreement is held to be unenforceable or invalid by any court of competent jurisdiction, the remainder of this Agreement shall remain in full force and effect and shall in no way be affected or invalidated thereby.

31. Demolition – Salvage and Recycling

As required by ORS 279C.510, Contractor shall salvage or recycle any construction and demolition debris if feasible and cost-effective.

32. Complete Agreement

This Agreement and attached exhibits constitutes the entire Agreement between the parties. No waiver, consent, modification, or change of terms of this Agreement shall bind either party unless in writing and signed by both parties. Such waiver, consent, modification, or change if made, shall be effective only in specific instances and for the specific purpose given. There are no understandings, agreements, or representations, oral or written, not specified herein regarding this Agreement. Contractor, by the signature of its authorized representative, hereby acknowledges that he has read this Agreement, understands it and agrees to be bound by its terms and conditions.

IN WITNESS WHEREOF, the City has caused this agreement to be executed by its duly authorized undersigned officer , acting pursuant to authorization of the City Council, duly passed at the regular meeting held on the (Day) day of (Month), (Year), and the Contractor has executed this agreement on the date herein above first written.

CITY OF TIGARD

CONTRACTOR

Signature

Signature

Printed Name & Title

Printed Name & Title

Date

Date

**CITY OF TIGARD, OREGON
PUBLIC WORKS CONTRACT PERFORMANCE BOND**

KNOW ALL MEN BY THESE PRESENTS, that we,

_____ *(Official Name & Form of Organization)*

Whose address is: _____ *(Street Address)*

_____ *(City)* _____ *(State)* _____ *(Zip)*
as Principal, and,

_____ *(Name of Surety)*

_____ *(Street Address of Surety)* _____ *(City)* _____ *(State)* _____ *(Zip)*

_____ *(Print - Agent / Contact Name)* _____ *(Phone Number)*

a corporation duly authorized to conduct a general surety business in the State of Oregon, as Surety, are jointly and severally held and bound unto the City of Tigard, Oregon, a municipality of the State of Oregon, hereinafter called Obligee, in the sum of

_____ and ____/100 DOLLARS (\$ _____),
(The Bare Contract Price, Both in Words & Figures)

lawful money of the United State of America, for the payment of which we, as Principal, and as Surety, jointly and severally bind ourselves, our successors and assigns firmly by these presents,

THE CONDITIONS OF THIS BOND AND OBLIGATION IS SUCH THAT

WHEREAS, on the (Day) day of (Month), (Year),

_____ *(Name of Contractor)*

the Principal herein, entered into a contract with the City of Tigard, Oregon, the Obligee herein, for the furnishings of materials, labor, and equipment and other requirements for the performance of certain improvements as more fully set forth in contract documents as described in said contract all of which are by reference made a part hereof,

NOW, THEREFORE, if the Principal herein shall faithfully and truly observe and comply with the terms of the contract and shall not permit any lien or claim to be filed or prosecution against the City on account of any labor or material furnished, and shall promptly pay all contributions or amounts due the State Unemployment Compensation Trust Fund incurred to the performance of said contract and shall promptly, as due, make payments to the person, co-partnership, association, or corporation entitled thereto of the money and sums mentioned in Section 279C.600 of the Oregon Revised Statutes, and shall promptly pay over to the Oregon State Tax Commission all sums required to be deducted and retained from wages of employees of the Principal and his sub-Contractors, pursuant to the Section 316.711, Oregon Revised Statutes, then this obligation is to be void, otherwise to remain in full force and effect.

The total amount of the Surety's liability under this bond both to the Obligee and to the persons furnishing labor or materials, provisions and goods to any person or persons, shall in no event exceed the penalty thereof.

Provided, however, that the conditions of this obligation shall not apply to any money loaned or advanced to the Principal or to any sub-Contractor or other person in the performance of any such work, whether specifically provided for in the contract or not.

This bond is executed for the purpose of complying with Chapter 279 of Title 26, Oregon Revised Statutes, the provisions of which are hereby incorporated herein and made a part hereof.

Said Surety for value received, hereby stipulates and agrees that no change, extension of time, alternation, or addition to the terms of the contract, or to the work to be performed thereunder or the specifications accompanying the same shall in anywise affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the contract or to the work or the specifications.

IN WITNESS WHEREOF, the parties hereto have caused this Bond to be executed in Portland, Oregon, this (Day) day of (Month), (Year).

Contractor

Principal Signature

Principal Printed Name

Witnesses:

Surety

(A true copy of the Power of Attorney must be attached to the original of this bond)

Surety Attorney of Fact

Countersigned:

Resident Agent

**CITY OF TIGARD, OREGON
PUBLIC WORKS CONTRACT PAYMENT BOND**

KNOW ALL MEN BY THESE PRESENTS, that we,

(Official Name & Form of Organization)

Whose address is:

(Street Address)

(City)

(State)

(Zip)

as Principal, and,

(Name of Surety)

(Street Address of Surety)

(City)

(State)

(Zip)

(Print - Agent / Contact Name)

(Phone Number)

a corporation duly authorized to conduct a general surety business in the State of Oregon, as Surety, are jointly and severally held and bound unto the City of Tigard, Oregon, a municipality of the State of Oregon, hereinafter called Obligee, in the sum of

_____ and ____/100 DOLLARS (\$ _____),
(The Bare Contract Price, Both in Words & Figures)

lawful money of the United State of America, for the payment of which we, as Principal, and as Surety, jointly and severally bind ourselves, our successors and assigns firmly by these presents,

THE CONDITIONS OF THIS BOND AND OBLIGATION IS SUCH THAT

WHEREAS, on the (Day) day of (Month), (Year),

(Name of Contractor)

the Principal herein, entered into a contract with the City of Tigard, Oregon, the Obligee herein, for the furnishings of materials, labor, and equipment and other requirements for the performance of certain improvements as more fully set forth in contract documents as described in said contract all of which are by reference made a part hereof,

NOW, THEREFORE, if the Principal herein shall faithfully and truly observe and comply with the terms of the contract and shall not permit any lien or claim to be filed or prosecution against the City on account of any labor or material furnished, and shall promptly pay all contributions or amounts due the State Unemployment Compensation Trust Fund incurred to the performance of said contract and shall promptly, as due, make payments to the person, co-partnership, association, or corporation entitled thereto of the money and sums mentioned in Section 279C.600 of the Oregon Revised Statutes, and shall promptly pay over to the Oregon State Tax Commission all sums required to be deducted and retained from wages of employees of the Principal and his sub-Contractors, pursuant to the Section 316.711, Oregon Revised Statutes, then this obligation is to be void, otherwise to remain in full force and effect.

The total amount of the Surety's liability under this bond both to the Obligee and to the persons furnishing labor or materials, provisions and goods to any person or persons, shall in no event exceed the penalty thereof.

Provided, however, that the conditions of this obligation shall not apply to any money loaned or advanced to the Principal or to any sub-Contractor or other person in the performance of any such work, whether specifically provided for in the contract or not.

This bond is executed for the purpose of complying with Chapter 279 of Title 26, Oregon Revised Statutes, the provisions of which are hereby incorporated herein and made a part hereof.

Said Surety for value received, hereby stipulates and agrees that no change, extension of time, alternation, or addition to the terms of the contract, or to the work to be performed thereunder or the specifications accompanying the same shall in anywise affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the contract or to the work or the specifications.

IN WITNESS WHEREOF, the parties hereto have caused this Bond to be executed in Portland, Oregon, this (Day) day of (Month), (Year).

Contractor

Principal Signature

Principal Printed Name

Witnesses:

Surety

(A true copy of the Power of Attorney must be attached to the original of this bond)

Surety Attorney of Fact

Countersigned:

Resident Agent

ENGINEER'S SIGNATURE AND SEAL

The Special Provisions contained herein have been prepared by or under the direction of the following Registered Engineer.

SPECIAL PROVISIONS (*For Template Agreement*)

DRAWINGS (*For Template Agreement*)

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Scope of work.
2. Type of Contract.
3. Work of Other Contracts.
4. Owner furnished products installed by Contractor.
5. Use of premises.
6. Work restrictions.
7. Specification formats and conventions.

1.2 SCOPE OF WORK

A. Project Identification: Tigard Senior Center, Renovation and Addition.

1. Project Location: 8815 SW O'Mara, Tigard, Oregon.

B. Owner: City of Tigard, 13125 SW Hall Blvd., Tigard, Oregon 97223.

C. Architect: LRS Architects, Inc., 720 NW Davis Street, Suite 300, Portland, Oregon 97209.

1. Contract Documents prepared for the Project by LRS Architects, Inc. are dated September 17, 2007.

D. The Work of the Contract includes tenant improvement renovations as indicated in the Drawings and as specified in this Project Manual, including Modifications incorporated into the Contract Documents.

1. Project consists of a two story, Type V-B construction, wood frame public building, A-3 occupancy, with fire sprinklers.

1.3 TYPE OF CONTRACT

A. Project will be constructed under a single prime contract.

1.4 WORK UNDER OTHER CONTRACTS

A. Concurrent Work:

1. Owner has or will award separate contract(s) for the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract:
 - a. Equipment identified as OFOI.
 - b. Casework identified as OFOI.
2. Products furnished by Owner and installed by Owner are identified as OFOI (Owner Furnished, Owner Installed).
3. Cooperate fully with separate contractors so that work under other contracts may be carried out smoothly, without interfering with or delaying work of this Contract.
4. Provide access to site and coordinate work according to the General Conditions of the Contract.

- B. If Work of other contractors in any way interferes with the Contractor's Work, notify party sufficiently in advance to give reasonable time to make necessary adjustments.
- C. If the Contractor's Work in any way interferes with the work of other contractors, notify other party and Owner as soon as possible and modify schedule to accommodate the other party's work, or make other arrangements to accommodate other contractors work as agreed to by Owner.
- D. Contractor recognizes that Owner is entitled, under the Contract Documents, to perform Work on site during the course of Contractor's performance, whether by Owner's forces, consultants, or separate contractors.

1.5 OWNER FURNISHED PRODUCTS INSTALLED BY CONTRACTOR

- A. Products furnished by Owner for installation by Contractor are identified as OFCI (Owner Furnished, Contractor Installed), and include the following:
 - 1. Commercial Laundry Equipment, identified as OFCI.
 - 2. Commercial Kitchen Equipment, identified as OFCI.
- B. Work of this Contract includes providing support systems to receive Owner's equipment, and mechanical and electrical connections.
- C. Owner Responsibilities:
 - 1. To arrange for and deliver necessary shop drawings, product data, and samples to Contractor.
 - 2. To arrange and pay for delivery of Owner furnished items according to Contractor's Construction Schedule.
 - 3. To inspect delivered products for damage and arrange for replacement of Owner furnished items found to be damaged, defective, or missing.
 - 4. To arrange for manufacturer's field services and delivery of manufacturer's warranty to Contractor.
 - 5. To furnish Contractor the earliest possible delivery dates for OFCI products.
- D. Contractor Responsibilities:
 - 1. To designate delivery dates of OFCI products in the Contractor's Construction Schedule, using Owner furnished earliest possible delivery dates for OFCI products.
 - 2. To review shop drawings, product data, and samples and return them to Architect noting discrepancies or problems anticipated in use of product.
 - 3. To be responsible for receiving, unloading, and handling Owner furnished items at the site.
 - 4. To be responsible for protecting Owner furnished items from damage, including damage from exposure to the elements, and to repair or replace items damaged as result of Contractor's operations.
 - 5. To install and otherwise incorporate Owner furnished items into the Work.

1.6 USE OF PREMISES

- A. General: Contractor shall confine construction operations, including storage of materials and equipment, to within the staging area established by the Owner.
 - 1. Contractor's use of area established for construction operations is limited only by Owner's right to perform work or to retain other Contractors for portions of Project.

2. Use of Owner's property outside staging area will not be permitted except under unusual circumstances for limited periods of time as approved by Owner.
- B. Maintain clear access to project at all times for emergency vehicles, delivery of materials, and Owner and Owner's employees access.
 - C. Contractor shall make arrangements with city and county agencies for use of public property for construction purposes and pay all fees required for such use.
 - D. Contractor is responsible for necessary cleaning and repair of adjacent streets resulting from Contractor's operations.
 - E. Use of Existing Building:
 1. Maintain existing building in a weathertight condition throughout the construction period.
 2. Repair damage caused by construction operations.
 3. Take all precautions necessary to protect the building during the construction period.

1.7 WORK RESTRICTIONS

- A. On Site Work Hours: Work shall be generally performed inside the existing building during normal business working hours of 8 AM to 5 PM, Monday through Friday, except as otherwise indicated.
- B. Existing Utility Interruptions: do not interrupt utilities serving facilities occupied by Owner others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 1. Notify Owner not less than two days in advance of proposed utility interruptions.
 2. Do not proceed with utility interruptions without Owner's written permission.

1.8 SPECIFICATION FORMAT AND CONVENTIONS

- A. Specification Format: Specifications are organized into Divisions and Sections using the 49 Division format and The Construction Specifications Institute's (CSI) "MasterFormat" 2004 Edition numbering system.
 1. Division 01 - General Requirements: Sections in Division 01 govern the execution of the Work of all Sections in the Specifications.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations, as follows:

1. Abbreviated Language:
 - a. Language used in the Specifications and other Contract Documents is abbreviated.
 - b. Words and meanings shall be interpreted as appropriate.
 - c. Words implied, but not stated, shall be inferred as the sense requires.
 - d. Singular words shall be interpreted as plural, and plural words as singular, where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications.
 - a. Requirements expressed in the imperative mood are to be preformed by Contractor.
 - b. Subjective or indicative language may be used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.
 - c. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes procedures for the following:
 - 1. Contractor's responsibilities concerning substitutions.
 - 2. Substitutions requests during the bidding period.
 - 3. Substitutions requests after award of Contract.
 - 4. Substitutions not permitted.
- B. Related Sections:
 - 1. Section 01 4200: Definitions and Reference Standards, for applicability of industry standards to products specified.
 - 2. Section 01 6000: Product Requirements, for requirements governing Contractor's selection of products and product options.

1.2 DEFINITIONS

- A. Substitutions: Contractor proposals for changes in products, materials, equipment, and methods of construction required by the Contract Documents made during bidding and after award of Contract are considered to be requests for substitution.
 - 1. The following are not considered to be requests for substitution:
 - a. Revisions to the Contract Documents requested by Owner or Architect.
 - b. Specified options of products and construction methods included in the Contract Documents.
 - c. Contractor's determination of and compliance with regulations and orders issued by governing authorities.
- B. Substitutions accepted during the bidding period are accepted by Addendum prior to award of Contract, and thereafter are included in the Contract Documents.
- C. Substitutions requested and accepted after award of contract are accepted only by Change Order, and thereafter are included in the Contract Documents.

1.3 CONTRACTOR'S RESPONSIBILITIES

- A. Contractor's responsibilities for substitution requests made after award of Contract are as follows:
 - 1. Investigate proposed products and determine they are equal or superior in all respects to products specified.
 - 2. Provide same guarantee for accepted substitutions as for products specified.
 - 3. Make changes in, and coordinate, the Work as may be required to incorporate and install accepted substitutions.
 - 4. Waive all claims for additional costs that subsequently become apparent which are related to substitutions.

1.4 SUBSTITUTION SUBMITTAL PROCEDURES

- A. Acceptability of different materials or products shall be determined by methods set forth in this Section.

- B. Architect will be sole judge of acceptability of any proposed substitution, and decision of Architect will be final.

PART 2 PRODUCTS

2.1 SUBSTITUTION REQUIREMENTS DURING THE BIDDING PERIOD

- A. Submit request for approval of a substitution on CSI Substitution Request Form; Copy included at the end of this Section.
- B. All substitution requests must be received in the Architect's office no less than 5 working days prior to Bid Date, unless otherwise stipulated in the Instructions to Bidders.

2.2 SUBSTITUTIONS REQUESTED AFTER AWARD OF CONTRACT

- A. Substitutions will normally not be considered after award of Contract, except due to unforeseen circumstances.
- B. Architect will receive and consider Contractor's request for substitution after award of Contract when one or more of the following conditions are satisfied, as determined by the Architect. If the following conditions are not met, Architect will return the requests without action except to record noncompliance with these requirements.

1. The specified product cannot be provided within the Contract time.
 - a. Architect will not consider the request if the product cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
2. The specified product cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
3. The specified product cannot be coordinated with other materials and the Contractor certifies that the proposed substitution can be coordinated.
4. The specified product cannot provide the required warranty and the Contractor certifies that the proposed substitution provides the warranty.
5. The requested substitution offers the Owner a substantial advantage in cost, time, or other considerations after deducting additional Owner's cost of compensation to the Architect for redesign and evaluation services, increased cost of other construction, and similar considerations.

- C. Contractor's submittal and Architect's acceptance of Shop Drawings, Product Data, or Samples for construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.

2.3 SUBSTITUTIONS NOT PERMITTED

- A. Substitutions indicated or implied on submitted Shop Drawings or Product Data without first requesting approval in accordance with requirements of this Section.
- B. Where manufacturers, products, or systems listed in the Specifications are not followed with "or approved" or "Substitutions: Provide in accordance with requirements of Section 01 2500," it is intended that substitutions are not permitted.

END OF SECTION



SUBSTITUTION REQUEST

LRS Architects, Inc.

TO: _____

PROJECT: _____

SPECIFIED ITEM: _____

Section	Page	Paragraph	Description
---------	------	-----------	-------------

PROPOSED SUBSTITUTION: _____

Attached data includes product description, specifications, drawings, photographs, performance and test data adequate for evaluation of request including identifying applicable data portions.

Attached data also includes description of changes to Contract Documents and proposed substitution required for its proper installation.

Undersigned certifies following items, unless modified by attachments, are correct:

- Proposed substitution does not affect dimensions shown on drawings.
- Undersigned pays for changes to building design, including engineering design, detailing, and construction costs caused by proposed substitution.
- Proposed substitution has no adverse effect on other trades, construction schedule, or specified warranty requirements.
- Maintenance and service parts available locally or readily obtainable for proposed substitution.

Undersigned further certifies function, appearance, and quality of proposed substitution are equivalent or superior to specified item.

Undersigned agrees, if this page is reproduced, terms and conditions for substitutions found in Bidding Documents apply to this proposed substitution.

Submitted by:

Name (printed or typed)

 Signature

 Firm Name

 Address

 City, State, Zip

 Date

 Telephone Fax

General Contractor (if after award of Contract)

For use by LRS	
<input type="checkbox"/> Approved	<input type="checkbox"/> Approved as Noted
<input type="checkbox"/> Not Approved	<input type="checkbox"/> Received Too Late
By _____	
Date _____	
Remarks _____	

2007 Edition

If After Award of Contract:
Reason for Substitution Request: _____

List of Attachments:

PART 1 GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing the following Contract modifications:
 - 1. Requests for Interpretation.
 - 2. Architect's Supplemental Instructions.
 - 3. Proposal Requests.
 - 4. Construction Change Directives.
 - 5. Change Orders.
- B. Related Documents and Sections:
 - 1. Section 01 2500: Substitution Procedures, for administrative procedures for handling request for substitutions made after Contract award.
 - 2. Section 01 7700: Closeout Procedures, for requirements for inclusion of contract modifications in record documents.

1.2 RESPONSIBLE PARTIES

- A. Immediately following Contract execution, Owner and Contractor to identify each person who is responsible for executing Change Orders and other modifications to the Contract.

1.3 DEFINITIONS

- A. Request for Interpretation (RFI):
 - 1. Written request submitted by Contractor to Architect on standard form requesting interpretation of Contract documents.
 - 2. An RFI shall only be used as a vehicle for confirming or verifying an issue through an interpretation of the Contract Documents; responses that result in change to Contract Documents and adjustment to Contract Sum and/or Contract Time must be documented in a Change Order.
- B. Architect's Supplemental Instructions (ASI):
 - 1. Architect's written order of instruction to Contractor, signed by Architect, that authorizes minor changes in Work that do not change Contract Sum or Contract Time.
- C. Proposal Request (PR):
 - 1. Initiated by Architect: Written request by Architect to Contractor to quote change to Contract Sum and/or Contract Time for proposed change to Contract Documents.
 - 2. Initiated by Contractor: Written request by Contractor to Architect proposing change to Contract Documents accompanied with quotation for change to Contract Sum and/or Contract Time.
- D. Construction Change Directive (CCD):
 - 1. Written order prepared by Architect, signed by Owner and Architect, directing Contractor to proceed with change to Contract Documents which affect Contract Sum and/or Contract Time, for subsequent inclusion in a Change Order after change to Contract Sum and/or Contract Time has been determined.

E. Change Order (CO):

1. Prepared by Architect and signed by Owner, Contractor, and Architect stating their agreement to a change to Contract Documents and adjustment to Contract Sum and/or Contract Time.

1.4 REQUEST FOR INTERPRETATION (RFI):

A. Submit RFIs numbered in sequential order, reviewed by Contractor with respect to Construction Documents, with the following information:

1. Project name and address.
2. Architects name.
3. Contractors name.
4. Date of RFI.
5. Drawing and/or Specification reference.
6. Signature of Contractor's reviewer.
7. Indicate "URGENT" on RFIs that may cause impact to the project schedule.

B. Architect will receive RFIs only from the Contractor; Architect will not accept RFIs directly from subcontractors, suppliers, or other entities.

C. Architect will receive only legible, properly prepared RFIs.

1. Unreadable facsimile machine RFIs, illegibly written RFIs, or RFIs with incomplete information, will be returned promptly without action.
2. RFIs may be transmitted to Architect by facsimile machine.
 - a. Architect will return response by same method received from Contractor.
3. Architect will review RFIs with respect to Contract Documents and return response within 7 calendar days.
 - a. RFIs marked "URGENT" will take precedence, in order received, over outstanding RFIs and be answered by Architect as soon as possible.

D. Contractor, in being fully familiar with Construction Documents, shall not be relieved of responsibility to coordinate the Work to prevent adverse impact to Project schedule when submitting RFIs to Architect for interpretation of Contract Documents.

1.5 ARCHITECT'S SUPPLEMENTAL INSTRUCTIONS (ASI)

A. Architect's Supplemental Instructions may include supplementary or revised Drawings and/or Specifications to describe minor changes to Contract Documents.

B. Architect's Supplemental Instructions will be executed on AIA Form G710, or other similar form designated by Architect.

1.6 PROPOSAL REQUEST (PR)

A. Proposal Request Initiated by Architect:

1. Proposal Request is a request for information only, and is not an instruction or authorization to execute the change, or an order to stop Work in progress.
2. Proposal Request may include supplementary or revised Drawings and/or Specifications to describe a proposed change to Contract Documents.

3. Contractor shall submit cost and/or time quotations to Architect within 10 working days following receipt of Proposal Request.

B. Proposal Request Initiated by Contractor:

1. Proposal Request is for a change in the Work accompanied by a detailed quotation of impact on Contract Sum and/or Contract Time.
2. Proposal Request may include revised Drawings and/or Specifications to describe a proposed change to Contract Documents.
3. Proposal Request is a request for information only, and does not authorize the Contractor to execute the change or stop Work in progress without the Architect's and Owner's authorization.
4. Contractor initiated Proposal Requests may take the form of a "Claim" where Contractor finds it necessary for proper execution of the Work, to propose a change in the Work that is not shown or indicated in Contract Documents, and may affect Contract Sum and/or Contract Time, which for which no Proposal Request or Construction Change Authorization has been issued by the Architect.
 - a. Contractor's determination that Architect's response to an RFI that affects Contract Sum and/or Contract Time may be addressed in a Proposal Request.
5. Architect shall respond to Contractor initiated proposals within 10 working days following receipt of Proposal Request.

1.7 CONSTRUCTION CHANGE DIRECTIVE (CCD)

- A. A Construction Change Directive is issued in lieu of a Proposal Request when time is of the essence and change to Contract Sum and/or Contract Time cannot be determined prior to start of the work.
- B. A Construction Change Directive is executed on AIA Form G714 or other similar form designated by Architect, and may include supplementary or revised Drawings and/or Specifications to describe change to the Contract Documents.
- C. Both Owner and Architect will sign and date a Construction Change Directive that directs the Contractor to proceed with change to the Contract Documents prior to determination of cost and/or time.
- D. Contractor shall submit to Architect itemized change to Contract Sum and/or Contract Time within 10 working days when possible, and no more than 30 calendar days, except for the following conditions:
 1. Unit prices have been agreed upon and quantities cannot be determined until work described in the CCD has been completed.
 2. Owner has agreed that Contract Sum and/or Contract Time of can be determined at completion of work described in the CCD.
- E. When Owner, Architect, and Contractor concur on change to Contract Sum and/or Contract Time, as described in the General Conditions for "Construction Change Directives," the change to Contract Sum and/or Contract Time will be included in a Change Order.

1.8 CHANGE ORDERS

- A. Architect will prepare each Change Order utilizing AIA Document G701, or other similar form acceptable to Owner.

- B. Changes to Project Contract Sum and/or Contract Time listed or indicated in Change Orders shall include or be determined by methods described in the General Conditions, and as follows:
 - 1. Proposal Requests approved for change to Contract Documents by Owner and Architect that have not been converted to a Construction Change Directive.
 - 2. Construction Change Directives where Owner, Architect, and Contractor have agreed to change in Project Contract Sum and/or Contract Time.
 - 3. Changes to Project Contract Sum and/or Contract Time that have not been documented by Proposal Request or Construction Change Directive, but have been agreed upon by Owner, Architect, and Contractor.

1.9 DOCUMENTATION FOR CONTRACT MODIFICATIONS

- A. Cost and Time Quotations: Support quotation for changes in the Work with sufficient substantiating data to allow Architect to evaluate quotation, to include the following:
 - 1. Labor expended in hours and unit cost.
 - 2. Equipment cost.
 - 3. Products, with quantities used and unit cost, including purchase source.
 - 4. Taxes, Insurance, and Bonds.
 - 5. Credit for deleted work where applicable with same documentation as required for cost increases for additional work.
 - 6. Overhead and profit, determined after credits have been deducted from additions.
 - 7. Justification for change in Contract Time.
- B. For claims for Work not authorized through Proposal Requests or Construction Change Directives, provide supporting documentation for each claim for additional cost as indicated above for cost and time quotations with the following additional information:
 - 1. Name of Owner's authorized agent who ordered work, and date of Order.
 - 2. Dates and hours work performed, and by whom.
 - 3. Timecard records, including summary of hours worked, and hourly rates paid.
 - 4. Receipts and invoices for products used including quantities and unit costs.
 - 5. Receipts and invoices for equipment utilized, including dates and time of use.
 - 6. Provide the same documentation indicated above for subcontracts same as required for Contractor's own forces.
- C. Document requests for Product substitutions according to requirements of Section 01 2500.

1.10 CORRELATING CHANGE ORDERS WITH OTHER REQUIREMENTS

- A. Revise Schedule of Values and Applications for Payment to record each Change Order as separate item of work with adjustment to Contract Sum and Contract Time as described in Section 01 2900: Payment Procedures.
- B. Revise Construction Schedule to reflect each change in Contract Time.
- C. Revise Subschedules to show changes for other items of work affected by modifications to Contract Documents.
- D. Record modifications in Record Documents.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections:
 - 1. Section 01 2600: Contract Modification Procedures, for administrative procedures for handling changes to the Contract.

1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of the Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
 - a. Application for Payment forms with Continuation Sheets.
 - b. List of Subcontractors, principle suppliers, and fabricators.
 - c. Submittals Schedule.
 - 2. Submit the Schedule of Values to Owner within 48 hours of bid submission.
 - a. Submit more detailed Schedule of Values to Architect at earliest possible date but no later than 7 days before date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of the Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. For Schedule of Values submitted to Owner within 48 hours of bid submission, use Attachment F form included in the Bid Package. For detailed Schedule of Values, Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value.
 - 1) Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
4. Round amounts to nearest whole dollar; the total to equal the Contract Sum.
5. Provide a separate line item for each part of the Work where Applications for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or bonded warehousing for items stored off-site.
6. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items or distributed as general overhead expense, at Contractor's option.
7. Update and resubmit the Schedule of Values before the next Application for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment date is as agreed to by the Owner and the Contractor. The period of construction Work covered by each Application for Payment is the period indicated in that Agreement.
- C. Payment Application Forms: Use AIA Document G702 and Continuation Sheets G703.
- D. Application Preparation: Complete every item of form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 1. Match entries with data on the Schedules of Values.
 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit 3 signed and notarized original copies of each application for payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
- F. Waivers of Mechanic Lien: With each Application for Payment, submit waivers of mechanic's lien from subcontractors, sub-subcontractor, and suppliers for construction period covered by the previous application.
 1. Submit partial waivers on each item for the amount requested in previous applications, after deduction for retainage, on each item.

2. When an application shows completion of an item, submit final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Submit final Application for payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 5. Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of Values.
 3. Contractor's Construction Schedule.
 4. Products list
 5. Submittals Schedule.
 6. List of Contractor's staff assignments.
 7. List of Contractor's principal consultants.
 8. Copies of building permits.
 9. Initial progress report.
 10. Report of preconstruction conference.
 11. Certificates of insurance and insurance policies.
 12. Performance and payment bonds.
 13. Data needed to acquire the Owner's insurance.
- H. Application for Payment at Substantial Completion: After issuance of the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
 3. Administrative actions and submittals that must precede or coincide with this application include the following:
 - a. Occupancy permits and similar approvals.
 - b. Warranties (guarantees) and maintenance agreements.
 - c. Test/adjust/balance records.
 - d. Maintenance instructions.
 - e. Final cleaning.
 - f. Application for reduction of retainage and consent of surety.
 - g. Advice on shifting insurance coverages.
 - h. List of incomplete Work recognized as exceptions to Architect's Certificate of Substantial Completion.
- I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Completion of items specified for completion after Substantial Completion.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. Evidence that claims have been settled.
 5. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 6. AIA Document G706A, "Contractor's Affidavit of Release of Liens."

7. Assurance that incomplete Work not accepted, if applicable, will be completed without undue delay.
8. Evidence that taxes, fees, and similar obligations were paid.
9. Removal of temporary facilities and services.
10. Removal of surplus materials, rubbish, and similar elements.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General Project coordination procedures.
2. Coordination Drawings.
3. Project meetings.
4. Construction schedule.
5. Submittal schedule.
6. Field Engineering.

B. Related Sections:

1. Section 01 3300: Submittal Procedures.
2. Section 01 6000: Product Requirements, for coordinating selection of products.
3. Section 01 7400: Cleaning, for coordinating progress and final cleaning.
4. Section 01 7700: Closeout Procedures, for coordinating Contract closeout requirements.

1.2 COORDINATION

A. Coordinate construction operations included in various Specification Sections to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, which depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
3. Coordinate storage or staging areas for all trades.

B. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

C. Administrative Procedures:

1. Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - a. Preparation of Contractor's construction Schedule.
 - b. Preparation of the Schedule of Values.
 - c. Installation and removal of temporary facilities and controls.
 - d. Delivery and processing of submittals.
 - e. Progress meetings.
 - f. Preinstallation conferences.
 - g. Startup and adjustment of systems.
 - h. Project closeout activities.

- D. Conservation: Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water, and materials.
- E. Coordination of Key Personnel: Within 15 days of commencement of construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site.
 - 1. Identify individuals, their duties and responsibilities.
 - 2. List addresses and telephone numbers, including home and office telephone numbers.
 - 3. Post copies of list in Project meeting room, and temporary field office. Keep list current at all times.

1.3 COORDINATION DRAWINGS

- A. Coordination Drawings: Prepare coordination drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
 - 1. Content: Project specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
 - a. Indicate functional and spatial relationships of components for architectural, structural, civil, mechanical, and electrical systems.
 - b. Indicated required installation sequences.
 - c. Indicate dimensions shown on Contract Documents and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

1.4 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
 - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 - 2. Agenda: Prepare the meeting agenda. Distribute agenda to all invited attendees.
 - 3. Minutes: Record significant discussions, and agreements achieved. Distribute meeting minutes to everyone concerned, including Owner and Architect, within 72 hours after each meeting.
- B. Preconstruction Conference:
 - 1. Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but not later than 15 days after execution of Agreement.
 - a. Hold conference at Project site or other location agreeable to Owner and Architect.
 - b. Conduct meeting to review responsibilities and personnel assignments.

2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties deemed necessary.
3. All participants shall be familiar with Project and authorized to conclude matters relating to the Work.
4. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Critical work sequencing and long-lead items.
 - c. Designation of key personnel and their duties.
 - d. Procedures for processing field decisions and Change Orders.
 - e. Procedures for requests for interpretations (RFIs).
 - f. Procedures for testing and inspection.
 - g. Procedures for processing Applications for Payment.
 - h. Distribution of Contract Documents.
 - i. Submittal procedures.
 - j. Routing of correspondence.
 - k. Preparation of Record Documents.
 - l. Use of premises.
 - k. Work restrictions.
 - m. Responsibility for temporary facilities and controls.
 - n. Construction waste management and recycling.
 - o. Site access, traffic, and parking availability and rules.
 - p. Office, work, and storage areas.
 - q. First aid.
 - r. Security.
 - s. Progress cleaning.
 - t. Owner's occupancy requirements.
5. Minutes: Contractor will record and distribute meeting minutes.

C. Preinstallation Conferences:

1. Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
2. Attendees: Contractor and its superintendent, installer and representatives of manufacturer's and fabricator's involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow. Include code enforcement personnel if required by local codes.

3. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. The Contract Documents.
 - b. Related Change Orders.
 - c. Submittals.
 - d. Review of mockups.
 - e. Possible conflicts or compatibility problems.
 - f. Time schedules.
 - g. Weather limitations.
 - h. Manufacturer's written recommendations.
 - i. Warranty requirements.
 - j. Acceptability of substrates.
 - k. Regulations of authorities having jurisdiction.
 - l. Testing and inspecting requirements.
 - m. Installation procedures.
 - n. Coordination with other work.
 - o. Protection of adjacent work.
4. Do not proceed with installation if conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene conference at earliest feasible date.
5. Minutes: Contractor will record and distribute meeting minutes to each party present and to parties who should have been present.

D. Progress Meetings:

1. Conduct progress meetings at Project site at regular scheduled intervals.
 - a. Coordinate meeting dates with preparation of payment request.
2. Attendees: Authorized representatives of Owner, Architect, Contractor, and each subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of immediate future activities.
 - a. Participants shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that affect progress, including topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

b. Review present and future needs of each entity present, including the following:

- 1) Interface requirements.
- 2) Sequence of operations.
- 3) Status of submittals.
- 4) Progress cleaning.
- 5) Status of correction of deficient items.
- 6) Field observations.
- 7) Requests for interpretation (RFIs).
- 8) Status of Proposal Requests.
- 9) Status of Change Orders.
- 10) Project administration issues.

5. Minutes: Contractor will record and distribute meeting minutes to Owner and Architect. Contractor shall be responsible for distribution to subcontractors, suppliers, or other entities concerned with current progress.
6. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit a comprehensive, fully developed, horizontal bar-chart type Contractor's Construction Schedule within 30 days after date established for commencement of Work.
- B. Indicate each significant construction activity separately. Identify first working day of each week with a continuous vertical line.
 1. Include start-up, finish, duration, slack time, approval dates, material ordering, delivery dates, anticipated shutdowns, partial occupancy and Owner use, Completion Date and other such information required to allow Owner's monitoring of progress of project and identifying critical path of events required to meet Completion Date.
 2. Use same breakdown of units of Work as indicated in Schedule of Values.
- C. Distribution: Following response to initial submittal, print and distribute copies to Architect, Owner, subcontractors, and other parties required to comply with scheduled dates.
- D. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized.
 1. Bring significant deviations from Schedule immediately to Owner's and Architect's attention.

1.6 SUBMITTALS SCHEDULE

- A. Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
 1. Coordinate Submittals Schedule with list of subcontract, the Schedule of Values, and Contractor's Construction Schedule.

1.7 FIELD ENGINEERING

A. Engineering Services:

1. Provide field engineering services as required for construction.
2. Locate and maintain an accurate benchmark on or near site that has been established by a Registered Surveyor. Relate subsequent elevations of finish grades and building elements directly to this benchmark.

B. Existing Control Points:

1. Protect control points prior to starting Work, and preserve permanent reference points during construction.
2. Make no changes or relocations of control points without prior written notice to Architect's Representative.
3. Report to Architect's Representative when any reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

C. Instrument Layout:

1. Use site benchmarks and existing elevation control points to establish lines and levels, located and laid out by survey instrumentation.
2. Locate water supply, storm and sanitary sewer lines.
3. Locate edge and level of paving, curbs, walks, and sloping landscape.
4. Locate building foundations, column locations, and floor levels.
5. Locate controlling lines and levels required for plumbing, mechanical and electrical Work within 5 feet of building perimeter.

D. Corrections:

1. Record changes in elevations or location of Work on project record Documents.
2. Report errors in horizontal and vertical dimensions and grades prior to starting Work.

E. Verification and Coordination:

1. Verify dimensions of new and existing Work.
 - a. If field measurements differ slightly from Drawings, modify to accommodate. If field measurements differ significantly, notify Architect prior to commencing Work.
2. Coordinate locations of openings through floors, roofs and walls with Architectural, Mechanical and Electrical Drawings.

F. Documentation:

1. Submit documentation to verify accuracy of field engineering work when requested by Architect.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for submittals required for performance of Work, including Shop Drawings, Product Data, and Samples.
- B. Related Sections:
 - 1. Section 01 2500: Substitution Procedures, for substitutions submittal requirements.
 - 2. Section 01 2900: Payment Procedures, for Applications for Payment and Schedule of Values submittal requirements.
 - 3. Section 01 3100: Project Management and Coordination, for Coordination Drawings, Contractor's Construction Schedule, Submittals Schedule, and distribution of meeting and conference minutes submittal requirements.
 - 4. Section 01 4500: Quality Control, for test and inspection reports submittal requirements.
 - 5. Section 01 7700: Closeout Procedures, for Record Drawings, Record Specifications, Operation and Maintenance Manuals, and warranties submittal requirements.
 - 6. Sections with specific requirements for submittals indicated in those Sections.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed by need to review submittals concurrently for coordination.
 - a. Architect reserves right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
 - b. Partial submittals may be rejected as not complying with these provisions.
- B. Submittals Schedule: Comply with requirements of Section 01 3100, Project Management and Coordination, for list of submittals and time requirements for scheduled performance of related construction activities.
- C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows.
 - 1. Time for review shall commence on Architect's receipt of submittal.
 - 2. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

3. Initial Review: Allow minimum 10 working days for initial review of each submittal.
 - a. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 4. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 5. Resubmittal Review: Allow minimum 10 working days for initial review of each submittal.
- D. Identification: Place a permanent label or title block on each submittal for identification.
1. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 2. Include the following information on label:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Name of firm or entity that prepared submittal.
 - f. Name of manufacturer.
 - g. Submittal number, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g. 06 1000.01). Resubmittals should include an alphabetic suffix (e.g. 06 1000.01A).
 - h. Number and title of appropriate Specification Section.
 - i. Drawing number and detail reference, as appropriate.
 - j. Location(s) where product is to be installed, as appropriate.
 - k. Other necessary identification.
- E. Submit items pertaining to only one Specification Section in each submittal.
- F. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.
- G. Transmittal: Package each submittal individually and appropriately for transmittal and handling.
1. Transmit each submittal from Contractor to Architect using a transmittal form.
 2. Architect will return submittals, without review, received from sources other than Contractor.
- H. Resubmittals: make resubmittals in same form and number of copies as initial submittal.
- I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others necessary as necessary for performance of construction activities.
- J. Use for Construction: Use only submittals with mark indicating Architect's final release.
- K. Submittal Log: Maintain an accurate submittal log for duration of Work, showing current status of submittals at all times. Make log available to Owner and Architect for review upon request.

PART 2 PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.

2.2 PRODUCT DATA

- A. Collect Product Data into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specifically prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not Product Data.
- B. Mark each copy of each submittal to show which products and options are applicable.
 - 1. Product Data, such as general product brochures containing information on other products that are not required or proposed for Work, which are not clearly marked to indicate which products and options are applicable to Project will be returned by Architect without review or action.
- C. Include following information, as applicable:
 - 1. Manufacturer's written recommendations.
 - 2. Manufacturer's product specifications.
 - 3. Manufacturer's installation instructions.
 - 4. Standard color charts.
 - 5. Manufacturer's catalog cuts.
 - 6. Compliance with specified referenced standards.
 - 7. Testing by recognized testing agency.
 - 8. Performance characteristics and capacities.
 - 9. Notation of dimensions verified by field measurement.
 - 10. Wiring diagrams showing factory installed wiring.
 - 11. Printed performance curves.
 - 12. Operational range curves.
 - 13. Mill reports.
 - 14. Notation of coordination requirements.
- D. Colors and Patterns: Except where specific color and pattern is indicated in Contract Documents, and whenever a choice of color or pattern is available in specified products, submit minimum 2 color and pattern charts to Architect for selection.
- E. Submit Product Data before or concurrent with Samples.
- F. Number of Copies: Submit the following for each required submittal:
 - 1. 2 copies for Architect.
 - 2. Number of copies as required for Maintenance manuals.
 - 3. Number of copies as required by Contractor for distribution.
- G. Architect will retain 2 copies and return remainder to Contractor, marked with action taken and, where applicable, corrections or modifications required.
 - 1. Distribute Product Data necessary for performance of construction activities.
 - 2. Retain number of copies required for maintenance manuals.

2.3 SHOP DRAWINGS

- A. Shop Drawings: Prepare Project specific information, drawn accurately to a scale sufficiently large to show pertinent aspects of item and its method of connection to Work. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal of Architect's CAD Drawings are permitted.
- B. Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - 1. Dimensions; Identify dimensions established by field measurement.
 - 2. Identification of products.
 - 3. Fabrication and installation drawings.
 - 4. Roughing-in and setting diagrams.
 - 5. Wiring Diagrams: Differentiate between manufacturer installed and field installed wiring.
 - 6. Shopwork manufacturing instructions.
 - 7. Templates and patterns.
 - 8. Schedules.
 - 9. Design calculations.
 - 10. Compliance with specified standards.
 - 11. Notation of coordination requirements.
 - 12. Relationship to adjoining construction clearly indicated.
 - 13. Seal and signature of professional engineer if specified.
- C. Sheet Size: Except for templates, patterns and similar full-size drawings, at least 8-1/2 by 11 inches but no larger than 30 by 42 inches
- D. Number of Copies: Submit 3 opaque copies of each submittal.
 - 1. One copy will be returned to Contractor marked with Architect's action taken and, where applicable, corrections or modifications required.
 - 2. Contractor is responsible for reproduction and distribution of final Shop Drawings as reviewed and necessary for performance of construction activities.

2.4 SAMPLES

- A. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of those characteristics between submittal and actual component as delivered and installed.
 - 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
- B. Identification: Attach label on unexposed side of Samples that includes the following:
 - 1. Generic description of Sample.
 - 2. Product name and name of manufacturer.
 - 3. Sample source.
 - 4. Submittal number, and number and title of appropriate Specification Section.
- C. Disposition: Maintain sets of approved Samples at Project site, available for quality control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
- D. Field Samples: Full-size examples erected on-site to illustrate finishes, coatings, or finish materials and to establish Project standard.

- E. Samples for Initial Selection: Submit manufacturer's color charts showing the full range of colors, textures, and patterns available.
 - 1. Submit 2 color charts. Architect will return 1 color chart with options selected.
- F. Samples for Verification: Submit full size units or Samples of size indicated, prepared from same material to be used in the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected.
 - 1. Samples include, but are not limited to, the following:
 - a. Partial sections of manufactured or fabricated components.
 - b. Small cuts or containers of materials.
 - c. Complete units of repetitively used materials.
 - d. Swatches showing color, texture, and pattern.
 - e. Color range sets.
 - f. Components used for independent testing and inspection.
 - 2. Number of Samples: Submit 3 sets of Samples. Architect will retain 1 sample and return remainder of sets to Contractor.
 - a. Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics are to be demonstrated.
 - b. If variation in color, pattern, or texture, or other characteristic is inherent in material or product represented by a Sample, submit at least 3 sets that show approximate limits of variations, or number of units indicated in individual Specification Sections.

2.5 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by Specification Sections.
 - 1. Number of Copies: 2 copies for Architect, unless otherwise indicated. Architect will not return copies.
 - 2. Certificates and Certifications.
 - a. Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an office or other individual authorized to sign documents on behalf of that entity.
 - 3. Test and Inspection Reports: Comply with requirements specified in Section 01 4500, Quality Control.
 - 4. Welding, Installer, Manufacturer, Product and Material Certificates: Prepare written statements on manufacturer's letterhead certifying compliance with requirements in the Contract Documents.

B. The following are Informational Submittals:

1. Test and Inspection Reports.
 2. Coordination Drawings.
 3. Contractor's Construction Schedule.
 4. Qualification Data.
 5. Welding Certificates.
 6. Installer Certificates.
 7. Manufacturer Certificates.
 8. Product Certificates.
 9. Material Certificates.
 10. Material Test Reports.
 11. Research/Evaluation Reports.
 12. Compatibility Test Reports.
 13. Field Test Reports.
 14. Maintenance Data.
 15. Design Data.
 16. Manufacturer's Instructions.
 17. Manufacturer's Field Reports
 18. Material Safety Data Sheets.
- a. Submit information directly to Owner; do not submit to Architect.
 - b. Architect will not review submittals that include MSDSs and will return the entire submittal for resubmittal.

2.6 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
- B. Delegated Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit 3 copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed by a design professional.
 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions.
 1. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, mark with an action stamp, and return to Contractor.
- C. Action Stamp: Architect will stamp each submittal with an action stamp, and mark stamp appropriately to indicate action taken, as follows:
 - 1. Final Unrestricted Release: When a submittal is marked "NO EXCEPTION TAKEN," Work covered by submittal may proceed provided it complies with requirements of Contract Documents. Final payment depends on that compliance.
 - 2. Final-But-Restricted Release: When a submittal is marked "MAKE CORRECTIONS NOTED," Work covered by submittal may proceed provided it complies with notations or corrections on submittal and requirements of Contract Documents. Final payment depends on that compliance.
 - 3. Returned for Resubmittal: When a submittal is marked "REVISE AND RESUBMIT," do not proceed with Work covered by submittal, including purchasing, fabrication, delivery, or other activity.
 - a. Revise or prepare a new submittal according to notations and resubmit. Repeat as necessary to obtain an action releasing submittal.
 - b. Do not use, or allow others to use, submittals marked "REVISE AND RESUBMIT," at Project site or elsewhere where Work is in progress.
 - 4. Submittals for Record:
 - a. Where a submittal is for record purposes or special processing or other activity, Architect will return submittal marked "RECORD ONLY."
- D. Informational Submittals: Architect will review each submittal and will not return it, return it marked "RECORD ONLY," or will reject and return it if it does not appear to comply with requirements.
- E. Unsolicited Submittals: Architect may not review submittals not required by the Contract Documents. Such submittals may be returned to sender without action, or discarded.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Products and installation for patching and extending Work.
2. Transition and adjustments.
3. Repair of damaged surfaces, finishes, and cleaning.

B. Related Sections:

1. Section 01 1100: Summary of Work, for Owner occupancy during construction.
2. Section 01 7320: Cutting and Patching.
3. Section 01 7400: Cleaning, for cleaning during construction.
4. Section 02 4116: Structure Demolition.

PART 2 PRODUCTS

2.1 PRODUCTS FOR PATCHING AND EXTENDING WORK

A. New Materials: As specified in product Sections; match existing Products and Work for patching and extending work.

1. Where new materials are indicated in the Drawings and product Section for material is not included in the Project Manual, provide new materials specified in the Drawings.

B. Type and Quality of Existing Products: Determine by inspection and testing Products where necessary, referring to existing Work as a standard.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that demolition is complete, and areas are ready for installation of new Work.

3.2 PREPARATION

A. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion.

B. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.

C. Remove debris and abandoned items from area and from concealed spaces.

D. Prepare surface and remove surface finishes to provide for proper installation of new work and finishes.

E. Close openings in exterior surfaces to protect existing work and salvage items from weather and extremes of temperature and humidity.

3.3 INSTALLATION

A. Coordinate work of alterations and renovations to expedite completion sequentially and to accommodate Owner occupancy.

- B. Project Finishes: Complete in all respects including operational mechanical and electrical work.
- C. Remove, cut, and patch Work in a manner to minimize damage and to provide a means of restoring Products and finishes to specified condition.
- D. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes.
- E. In addition to specified replacement of equipment and fixtures restore existing plumbing, heating, ventilation, air conditioning, and electrical systems to full operational condition.
- F. Install Products as specified in individual Sections.

3.4 TRANSITIONS

- A. Where new Work abuts or aligns with existing, perform a smooth and even transition. Patched Work to match existing adjacent Work in texture and appearance.
- B. When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.

3.5 ADJUSTMENTS

- A. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
- B. Where a change of plane of 1/4 inch or more occurs, submit to Architect a recommendation for providing a smooth transition.
- C. Trim existing doors as necessary to clear new floor finish. Refinish trim as required.
- D. Fit work at penetrations of surfaces as specified in Section 01 7329, Cutting and Patching.

3.6 REPAIR OF DAMAGED SURFACES

- A. Patch or replace portions of existing surfaces that are damaged, lifted, discolored, or showing other imperfections.
- B. Repair substrate prior to patching finish.

3.7 FINISHES

- A. Finish surfaces as specified in individual Product Sections.
- B. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.8 CLEANING

- A. In addition to cleaning specified in Division 1 Sections, clean Owner occupied areas affected by Work of this Project.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Certain components of the Work under this project are Design Build. It is the Contractor's responsibility to coordinate and assume or assign to subcontractors the complete responsibility for the design, calculations, submittals, fabrication, transportation, and installation of the Design Build portions or components as required in this Section. The Applicant is responsible for submitting to the City of Tigard, all Design Build documents required for the separate approval for each Design Build item. There are no exceptions. Design Build components of this Work are defined as complete, operational systems, provided for their intended use.
- B. The Architect's or Engineer of Record's review of Design Build submittals shall be for design intent and shall not lessen nor shift the responsibility from the Applicant or the assigned subcontractor to the Owner nor to the design professional. The Owner shall not be responsible for paying for any delays, additional products, additional hours of work or overtime, restocking or rework required due to failure by the Applicant or the subcontractor to coordinate their Work with the Work of other trades on the project or to provide the Design Build portion or component in a timely manner to meet the schedule of the project.
- C. City of Tigard Requirements: Follow the City of Tigard's requirements current at the time of submission. The Applicant is responsible for coordinating and submitting all material required by the City so that the City's review will not adversely affect the construction schedule. At or near the time of application, the Applicant shall meet with the City to identify Design Build components and how they are to be submitted and processed.
- D. Design Build Components of the Work: Design Build components known at this time:
 - 1. Metal Fabrications.
 - 2. Metal Railings.
 - 3. Wood I-Joists.
 - 4. Metal Roof Panels.
- E. Refer to systems descriptions in technical Sections of these Specifications for additional information on Design Build work.

1.2 DEFINITIONS

- A. Applicant: Person applying for building permit and person coordinating Design Build systems with basic building and with each other. Includes coordination of required submittals.
- B. Architect or Engineer of Record: Architect or Engineer registered in state that Project is located, engaged by the Owner to provide plans and computations, and establish design criteria for Design Build components and specifications required by the Building Official for principle Project systems. Includes staff, consultants, and consultants' staffs.
- C. Contractor: Entity engaged by the Owner to construct the Project. Includes employees, subcontractors, suppliers, and their employees.

- D. Design Build Engineer: Professional Engineer registered in state that Project is located, engaged by the Contractor to provide plans, computations, and specifications required by the Building Official for a designated builder-designed specialty system, in accordance with criteria set forth in Contract Drawings and Specifications.
- E. Seal: Certification that plans, computations, and specifications were designed and prepared under the direct supervision of the Engineer whose name appears thereon.
- F. Review Stamp: Certification that the Architect or Engineer has reviewed plans, computations, and specifications bearing the seal of the Design Build Engineer, verifying conformance with information given and design concept set forth in Contract Drawings and Specifications.
- G. Approval Stamp: Certification that the Building Official has reviewed a submittal and finds it acceptable with respect to applicable code compliance.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 3300, Submittal Procedures.
- B. Design Build submittals are required to show complete criteria, design assumptions, details, calculations, submittals, instructions for fabrication, assembly, installation and interface with other trades, unless noted otherwise in the specific Specification Section.
- C. Complete submittals shall be submitted with the Design Build Engineer's seal and calculations for that portion of Work. Submittals without required calculations, without the Design Build Engineer's seal, and which have not been reviewed by the Contractor will not be reviewed by the Architect or Engineer of Record.

1.4 SPECIFIC REQUIREMENTS

- A. Some Design Build components are shown in the Contract Documents for design intent. The purpose is to have the Contractor responsible for providing, coordinating, and installing the Design Build component.
- B. Design Build components attached to the structural frame or supplemental to the structural frame shall be designed for the anticipated loads as outlined in the Contract Documents. These Design Build components shall be coordinated with the appropriate subcontractors.
- C. Load reactions at the interface between the Design Build components and the structural frame shall be clearly defined to allow for a review by the Architect or Engineer of Record.

END OF SECTION

PART 1 GENERAL

1.1 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on the Contractor's applications and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Reviewed": When used in lieu of "Approved" to convey Architect's action on the Contractor's submittals, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.
- D. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted," have the same meaning as "directed."
- E. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in the Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- F. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- G. "Furnish": Supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- H. "Install": Operations at the Project site including unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- I. "Provide": Furnish and install, complete and ready for the intended use.
- J. "Installer": Contractor or another entity engaged by the Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
- K. "Experienced": When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- L. "Project Site": Space available for performing construction activities. The extent of Project site is shown in Drawings and may or may not be identical with the description of the land on which Project located.
- M. "Testing Agencies": Independent entities engaged to perform specific inspections or tests, either at the Project site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.2 INDUSTRY STANDARDS

- A. **Applicability of Standards:** Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. **Publication Dates:** Comply with standards in effect as of the date of the Contract Documents, unless otherwise indicated.
- C. **Copies of Standards:** Each entity engaged in construction on the Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.
- D. **Conflicting Requirements:** Comply with the most stringent requirement when compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels.
 - 1. Refer uncertainties and requirements that are different, but apparently equal, to the Architect for decision before proceeding.
- E. **Minimum Quantity or Quality Levels:** The quantity or quality level shown or specified shall be the minimum provided or performed.

1.3 ABBREVIATIONS AND ACRONYMS

- A. **Standards and Regulations:** Where abbreviations and acronyms are used in Specification or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA)	800-872-2253
	Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities	202-272-0080
	Available from Access Board www.access-board.gov	202-272-0080
CFR	Code of Federal Regulations	888-293-6498
	Available from Government Printing Office www.gpoaccess.gov/ecfr/index.html	202-512-1530
UFAS	Uniform Federal Accessibility Standards	800-872-2253
	Available from Access Board www.access-board.gov	202-272-0080

- B. Industry Organizations: Where abbreviations and acronyms are used in Specification or other Contract Documents, they shall mean the recognized name of entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association, Inc. (The) www.aluminum.org	202-862-5100
AAADM	American Association of Automatic Door Manufacturers www.aaadm.com	216-241-7333
AABC	Associated Air Balance Council www.aabchq.com	202-737-0202
AAMA	American Architectural Manufacturers Association www.aamanet.org	847-303-5664
AASHTO	American Association of State Highway and Transportation Officials www.transportation.org	202-624-5800
AATCC	American Association of Textile Chemists and Colorists (The) www.aatcc.org	919-549-8141
ACI	American Concrete Institute / ACI International www.aci-int.org	248-848-3700
AFPA	American Forest & Paper Association www.afandpa.org	800-878-8878 202-463-2700
AGA	American Gas Association www.aga.org	202-824-7000
AGC	Associated General Contractors of America (The) www.agc.org	703-548-3118
AHA	American Hardboard Association (See CPA)	
AHAM	Association of Home Appliance Manufacturers www.aham.org	202-872-5955
AI	Asphalt Institute www.ashpaltinstitute.org	859-288-4960
AIA	American Institute of Architects (The) www.aia.org	202-626-7300
AITC	American Institute of Timber Construction www.aitc-glulam.org	303-792-9559
ALCA	Associated Landscape Contractors of America www.alca.org	800-395-2522 703-736-9666
ALSC	American Lumber Standards Committee, Incorporated www.alsc.org	301-972-1700

AMCA	Air Movement and Control Association International, Inc. www.amca.org	847-394-0150
ANSI	American National Standards Institute www.ansi.org	202-293-8020
APA	APA - The Engineered Wood Association www.apawood.org	253-565-6600
ARI	Air-Conditioning & Refrigeration Institute www.ari.org	703-524-8800
ARMA	Asphalt Roofing Manufacturers Association www.asphaltroofing.org	202-207-0917
ASCE	American Society of Civil Engineers www.asce.org	800-548-2723 703-295-6300
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. www.ashrae.org	800-527-4723 404-636-8400
ASME	ASME International (The American Society of Mechanical Engineers International) www.asme.org	800-843-2763 212-591-7722
ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	440-835-3040
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	601-832-9585
AWCI	AWCI International www.awci.org	703-534-8300
AWI	Architectural Woodwork Institute www.awinet.org	800-449-8811 703-733-0600
AWPA	American Wood-Preservers' Association www.awpa.com	334-874-9800
AWS	American Welding Society www.aws.org	800-443-9353 305-443-9353
AWWA	American Water Works Association www.aws.org	800-926-7337 305-794-7711
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	212-297-2122
CISCA	Ceiling and Interior Systems Construction Association www.cisca.org	630-584-1919
CISPI	Cast Iron Soil Pipe Institute www.cispi.org	423-892-0137

CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	301-596-2583
CPPA	Corrugated Polyethylene Pipe Association www.cppa-info.org	800-510-2772 202-462-9607
CRI	Carpet and Rug Institute (The) www.carpet-rug.com	800-882-8846 706-278-3176
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	847-517-1200
CS	Commercial Standard of National Bureau of Standards	202-512-1800
CSA	CSA International (Formally: IAS - International Approval Services) www.csa-international.org	800-463-6727 416-747-4000
CSI	Construction Specifications Institute (The) www.csinet.org	800-689-2900 703-684-0300
DHI	Door and Hardware Institute www.dhi.org	703-222-2010
EJMA	Expansion Joint Manufacturers Association, Inc. www.asce.org	914-332-0040
FMG	FM Global (Formally FM - Factory Mutual System) www.fmglobal.com	401-275-3000
GA	Gypsum Association www.gypsum.org	202-289-5440
GANA	Glass Association of North America www.glasswebsite.com	785-271-0208
GSi	Geosynthetic Institute www.geosynthetic-institute.org	610-522-8440
HMMA	Hollow Metal Manufacturers Association (Part of NAAMM)	
HPVA	Hardwood Plywood and Veneer Association www.hpva.org	703-435-2900
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) www.ieee.org	212-419-7900
IESNA	Illuminating Engineering Society of North America www.iesna.org	212-248-5000
ITS	Intertek www.intertek.com	800-345-3851 607-753-6711

IGCC	Insulating Glass Certification Council www.igee.org	315-646-2234
IGMA	Insulating Glass Manufacturers Alliance (The) www.igmaonline.org	613-233-1510
ISO	International Organization for Standardization www.iso.ch	41 22 74901 11
LMA	Laminating Materials Association (Now part of CPA)	
MPI	The Master Painters Institute www.paintinfo.com	888-674-8937
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	312-332-0405
NAIMA	The North American Insulation Manufacturers Association www.naima.org	703-684-0084
NCTA	National Cable & Telecommunications Association www.ncma.org	202-775-3550
NECA	National Electrical Contractors Association www.necanet.org	301-657-3110
NEMA	National Electrical Manufacturers Association 1300 North 17th Street, Suite 1847 Rosslyn, VA 22209 703-841-3200 www.nema.org	
NFPA	National Fire Protection Association www.nfpa.org	800-344-3555 617-770-3000
NFRC	National Fenestration Rating Council www.nfrc.org	301-589-1776
NGA	National Glass Association www.glass.org	703-442-4890
NHLA	National Hardwood Lumber Association www.natlhardwood.org	800-933-0318 901-377-1818
NLGA	National Lumber Grades Association www.nlga.org	604-524-2393
NRCA	National Roofing Contractors Association www.nrca.net	800-323-9545 847-299-9070
NRMCA	National Ready Mixed Concrete Association www.nrmca.org	888-846-7622 301-587-1400
NSSGA	National Stone, Sand & Gravel Association www.ntma.com	800-342-1415 703-525-8788

NWCB	Northwest Wall and Ceiling Bureau (Seattle) Northwest Wall and Ceiling Bureau (Portland)	800-524-4215 503-295-0333
NWWDA	National Wood Window and Door Association (Now WDMA)	
PCA	Portland Cement Association www.portcement.org	847-966-6200
RCSC	Research Council on Structural Connections www.boltcouncil.org	800-644-2400 312-670-2400
RFCI	Resilient Floor Covering Institute www.rfci.com	301-340-8580
SDI	Steel Door Institute www.steeldoor.org	440-899-0010
SGCC	Safety Glazing Certification Council www.sgcc.org	315-646-2234
SIGMA	Sealed Insulating Glass Manufacturers Association (Now IGMA)	
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association, Inc. www.smacna.org	703-803-2980
SWRI	Sealant, Waterproofing, and Restoration Institute www.swrionline.org	816-472-7974
TCNA	Tile Council of North America, Inc. www.tileusa.com	864-646-8453
TPI	Truss Plate Institute www.tpinstg.org	608-833-5900
UL	Underwriter's Laboratory, Incorporated www.ul.com	800-704-4050 847-272-8800
WCLIB	West Coast Lumber Inspection Bureau www.wclib.org	800-283-1486 503-639-0651
WCSC	Window Covering Safety Council www.wclib.org	800-506-4636 212-661-4261
WMMPA	Wood Moulding & Millwork Producers Association www.wmmpa.com	800-550-7889 530-661-9591
WSRCA	Western States Roofing Contractors Association www.wsrca.com	800-725-0333 650-548-0112
WWPA	Western Wood Products Association www.wwpa.org	503-224-3930

- C. Code Agencies: Where abbreviations and acronyms are used in Specification or other Contract Documents, they shall mean the recognized name of entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

IBC	International Building Code	
ICC	International Code Council, Inc. www.iccsafe.org	703-931-4533
ICC-ES	ICC Evaluation Service, Inc. www.ice-es.org	800-423-6587 562-699-0543
OSSC	State of Oregon Structural Specialty Code	
NES	(Formally: National Evaluation Service – See ICC-ES)	

- D. Federal Government Agencies: Where abbreviations and acronyms are used in Specification or other Contract Documents, they shall mean the recognized name of entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CPSC	Consumer Product Safety Commission www.cpsc.org	800-638-2772 301-504-6816
EPA	Environmental Protection Agency www.epa.org	202-272-0167
OSHA	Occupational Safety & Health Administration www.osha.gov	800-321-6742 202-693-1999

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for quality control services.

1. Quality control services include inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities.

a. Requirements do not include Contract enforcement activities performed by Architect.

2. Inspection and testing services are required to verify compliance with requirements specified or indicated.

B. Related Sections:

1. Section 01 7329: Cutting and Patching, for requirements for repair and restoration of construction disturbed by inspection and testing activities.

2. Section 03 3000: Cast-In-Place Concrete, for independent testing of concrete mix design and for concrete slab moisture vapor emissions.

3. Section 09 6517: Linoleum Flooring, for independent testing requirements for concrete slab moisture vapor emissions.

4. Section 09 6500: Resilient Flooring, for independent testing requirements for concrete slab moisture vapor emissions.

5. Section 09 6813: Tile Carpeting, for independent testing requirements for concrete slab moisture vapor emissions.

1.2 RESPONSIBILITIES

A. Owner will contract separately for services of independent testing laboratory to perform specified inspection and testing.

B. Inspections and testing costs required by defective Work or improperly-timed notices shall be paid by Contractor.

C. Utilization of testing laboratory services shall in no way relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

1.3 RETESTING

A. Contractor responsible for retesting and associated cost where results of inspections and tests prove unsatisfactory and indicate noncompliance with requirements.

1.4 ASSOCIATED SERVICES

A. Cooperate with agencies performing inspections and tests.

B. Provide auxiliary services as requested.

C. Notify agency in advance of operations to permit assignment of personnel.

D. Auxiliary services include, but are not limited to, following:

1. Providing access to Work.

2. Furnishing incidental labor and facilities necessary to facilitate inspections and tests.

- E. Coordinate activities to accommodate services with a minimum of delay.
- F. Contractor is responsible for scheduling inspections and tests.
 - 1. Except where indicated as responsibility of testing agency, Contractor is responsible for taking samples.

1.5 QUALITY ASSURANCE

- A. Qualifications for Inspection and Testing Agencies:
 - 1. Engage inspection and testing service agencies that are prequalified as complying with American Council of Independent Laboratories' "Recommended Requirements for Independent Laboratory Qualification" and that specialize in types of inspections and tests to be performed.
 - 2. Each independent inspection and testing agency engaged on Project shall be authorized by authorities having jurisdiction to operate in State where Project is located.
- B. Duties of Testing Agency:
 - 1. Testing agency shall cooperate with Architect and Contractor in performing its duties.
 - 2. Agency shall provide qualified personnel to perform inspections and tests.
 - 3. Agency shall notify Architect and Contractor of irregularities or deficiencies observed in Work during performance of its services.
 - 4. Except as otherwise specified, testing laboratory shall secure, handle, and store samples and specimens for testing.
- C. Submittals: Testing agency shall submit a certified written report of each inspection and test to:
 - 1. Architect
 - 2. Contractor
 - 3. Governmental agencies requiring submission of reports
 - 4. Other persons as directed by Architect.

PART 2 PRODUCTS - Not Applicable

PART 3 EXECUTION

3.1 SPECIAL INSPECTIONS

- A. Comply with requirements of Section 1701 of Oregon Structural Specialty Code based on 2003 Edition of the International Building Code.
- B. Following Sections contain requirements for special inspections:
 - 1. Section 03 3000: Cast-In-Place Concrete
 - 2. Section 05 5000: Metal Fabrications

3.2 MANUFACTURER'S FIELD SERVICES AND REPORTS

- A. Submit qualifications of observer to Architect/Engineer 30 days in advance of required observations.
 - 1. Observer subject to approval of Architect/Engineer and Owner.

- B. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe:
 - 1. Site conditions
 - 2. Conditions of surfaces and installation
 - 3. Quality of workmanship
 - 4. Start-up of equipment
 - 5. Test, adjust, and balance of equipment applicable, and to initiate instructions when necessary.
- C. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.
- D. Submit report in duplicate within 30 days of observation to Architect/Engineer for review.

3.3 REPAIR AND PROTECTION

- A. Upon completion of inspection, testing, and sample taking, repair damaged construction.
 - 1. Restore substrates and finishes.
 - 2. Comply with Section 01 7329, Cutting and Patching.
- B. Protect construction exposed by or for quality control service activities, and protect repaired construction.
- C. Repair and protection are Contractor's responsibility, regardless of assignment of responsibility for inspection and testing.

3.4 EVALUATION OF TESTS AND INSPECTIONS

- A. Satisfactory completion of Work will be judged on results of laboratory and site tests and inspections.
- B. Results of tests and inspections that indicate Work does not comply with requirements of Contract Documents will be considered deficient.
- C. Contractor has responsibility to remove and replace deficient Work at Contractor's expense.

END OF SECTION

PART I GENERAL

1.1 SUMMARY

- A. This Section includes requirements for temporary utilities, support facilities, security and protection facilities.

1.2 USE CHARGES

- A. General: Include cost or use charges for temporary facilities in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.
- B. Existing Utility Services: Water and electric power from Owner's existing systems is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.3 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to:
 - 1. Building code requirements.
 - 2. Health and safety regulations.
 - 3. Utility company regulations.
 - 4. Police and fire department rules.
 - 5. Environmental protection regulations.
- B. Standards: Comply with the following:
 - 1. NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations."
 - 2. ANSI A10 Series standards for "Safety Requirements for Construction and Demolition."
 - 3. NECA Electrical Design Library "Temporary Electrical Facilities."
- C. Electric Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70 "National Electric Code."
- D. Tests and Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.3 PROJECT CONDITIONS

- A. Keep temporary services and facilities clean and neat in appearance.
- B. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.
- C. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Provide new materials, or use undamaged, used materials in serviceable conditions, suitable for use intended.

2.2 TEMPORARY FACILITIES

- A. Temporary Offices: Provide prefabricated or mobile units or similar job-built construction with lockable entrances, operable windows, and serviceable finishes, of sufficient size and furnished to accommodate needs of construction personnel.

- 1. Use of Owner's existing building will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- 2. Provide enclosed space within field office adequate for project meetings.

- B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

- 1. Use of Owner's existing building will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL-rated, with class and extinguishing agent as required by locations and classes of fire exposures.

- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid propane gas or fuel oil heaters with individual space thermostatic control.

- 1. Use of gasoline burning space heaters, or open flame, or salamander heating units is prohibited.
- 2. Heating Units: Listed and labeled for type of fuel being consumed, by UL, FM, or another a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

PART 3 EXECUTION

3.1 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.

- 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

- 1. Connect temporary sewers to private system indicated as directed by authorities having jurisdiction.

- C. Water Service: Use of Owner's existing water service facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel.
 - 1. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of the fixtures and facilities.
 - 2. Toilets: Use of Owner's existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- E. Electric Power Service: Use of Owner's existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Owner.
- F. Lighting: Provide temporary lighting with local switching that will provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- G. Heating: Provide temporary heat required by construction activities for curing or drying of completed installations or for protection of installed construction from adverse effects of low temperatures or high humidity.
- H. Telephone: Provide temporary telephone service in common use facilities for use by all personnel engaged in construction activities.
 - 1. Provide one telephone line in each field office.
 - 2. Provide a dedicated telephone line for a facsimile machine in each field office.
 - 3. Make telephone and facsimile service available to use by the Owner and Architect.
 - 4. At each telephone, post a list of important telephone numbers, including the following:
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Architect's office.
 - e. Engineer's office.
 - f. Owner's office.
 - g. Principal subcontractor's field and home offices.

3.2 SUPPORT FACILITIES

- A. Dewatering Facilities and Drains: comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
- B. Project Identification Signs: Provide Project identification and other signs.
 - 1. Provide temporary, directional signs for construction personnel and visitors.
 - 2. Do not permit installation of unauthorized signs.
- C. Water Disposal Facilities: Comply with requirements specified in Section 01 7419, Construction Waste Management.
- D. Lifts and Hoists: Provide facilities for hoisting materials and employees.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.3 SECURITY AND PROTECTION FACILITIES

- A. Environmental Protection:
 - 1. Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or that other undesirable effects.
 - 2. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.
- B. Site Enclosure Fence: Provide site enclosure fence in manner that will prevent people and animals from easily entering site except by entrance gates.
- C. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, or similar violations of security.
- D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structural adequate barricades, including warning signs and lighting.
 - 1. Provide appropriate warning signs to inform personnel and the public of hazards being protected against.
- E. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
- F. Temporary Fire Protection: Install and maintain temporary fire protection facilities of types needed to protect against reasonably predictable and controllable fire losses until permanent fire protection facilities are operable.
 - 1. Comply with NFPA 10 and NFPA 241.
 - 2. Store combustible materials in containers in fire safe locations.
 - 3. Maintain unobstructed access to fire protection equipment.
 - 4. Supervise welding operations, combustion type temporary heating units, and similar sources of fire ignition.
 - 5. Develop and post information for overall fire prevention and protection program for personnel at Project site.
 - 6. Provide temporary standpipes and hoses for fire protection when required by code or authorities having jurisdiction.

3.4 TERMINATION AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until removal.
- C. Termination and Removal: Remove each temporary facility when the need for its service has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion.
 - 1. Materials and facilities that constitute temporary facilities are property of the Contractor.
 - 2. The Owner reserves the right to take possession of Project identification signs.

- D. At Substantial Completion, clean and renovate permanent facilities used during the construction period.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements governing the Contractor's selection of products for use in the Project.
- B. Related Sections:
 - 1. Section 01 2500: Substitution Procedures.
 - 2. Section 01 4200: Definitions and Reference Standards.

1.2 DEFINITIONS

- A. "Products" are items purchased for incorporation in the Work.
 - 1. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 2. "Named Products" are items identified by the manufacturer's product name, including make or model number or other designation, listed in the manufacturer's published product literature.
- B. "Materials" are products shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
- C. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

1.3 SUBMITTALS

- A. Product List: Before Contractor's first request for payment, submit a complete list of major products proposed for use in the Project.
 - 1. Include proprietary product names, manufacturer's name, and installing Subcontractor's name.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Provide products of the same kind from a single source to the fullest extent possible.
- B. Compatibility of Products: When given the option of selecting products, Contractor is responsible for providing products and construction methods that are compatible with previously selected products and construction methods, or products that have been specified to which the selected products must be compatible.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products according to the manufacturer's recommendations.
- B. Schedule delivery to minimize long-term storage at the site.
- C. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, or other losses.

- D. Deliver products to the site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
- E. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- F. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
- G. Store products subject to damage by weather above ground, under cover in a weathertight enclosure, and with ventilation adequate to prevent condensation.
 - 1. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 PRODUCTS

2.1 PRODUCT SELECTION

- A. General: Provide products that comply with the Contract Documents, are undamaged, and are new at the time of installation.
- B. Proprietary Specification Requirements: Where only a single product or manufacturer is named, provide the product indicated. No substitutions are permitted.
- C. Semi-proprietary Specification Requirements: Where two or more products or manufacturers are named, provide one of the products indicated that complies with Specifications. No substitutions are permitted.
- D. Nonproprietary Specifications: When products or manufacturers are not listed, the Contractor may use any product by any manufacturer that complies with the Specifications and referenced standards.
- E. Product Substitutions: Where products or manufacturers are named and accompanied by the term "equal," "approved," or "approved equal," comply with Section 01 2500, Substitution Procedures, to obtain approval of an unnamed product.
- F. Descriptive Specification Requirements: Where a product or assembly listing exact characteristics required, provide a product or assembly that provides those characteristics and otherwise complies with Contract requirements.
- G. Performance Specification Requirements: Where compliance with performance requirements are specified, provide products that comply with those requirements and are recommended by the manufacturer for the application indicated.
- H. Specified Standards, Codes, and Regulations: Where compliance with an imposed code, standard, or regulation is specified, provide a product that complies with that code, standard, or regulation.
- I. Visual Matching: Where matching a sample, the Architect's decision will be final on whether a proposed product matches satisfactorily.
- J. Visual Selection: Where product requirements include the phrase ". . . as selected from manufacturer's standard colors, patterns, textures, .." or a similar phrase, the Architect will select the color, pattern, and texture from the product line selected that complies with other specified requirements.

- K. Inappropriate Product Selections: If Contractor believes specified product, method, or system is inappropriate for use Contractor shall notify the Architect before performing Work in question.
 - 1. If notice of objection is not received prior to delivery to site, it will be assumed by Owner that Contractor agrees specified products, methods, and systems are appropriate for use in the Project.

PART 3 EXECUTION

3.1 INSTALLATION OF PRODUCTS

- A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated.
 - 1. Anchor each product securely in place, accurately located and aligned with other Work.
 - 2. Clean exposed surfaces and protect as necessary from damage and deterioration.
- B. Should job conditions or specified requirements conflict with Manufacturers' instructions, consult Architect for further instructions.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes requirements for cutting, fitting, and patching of Work required to:
1. Make several parts fit properly.
 2. Uncover work to provide for installing, inspecting, or both, of ill-timed work.
 3. Remove and replace work not conforming to requirements of Contract Documents.
 4. Remove and replace defective work.
- B. Related Sections:
1. Section 01 3100: Project Management and Coordination, for coordinating cutting and patching with other construction activities.
 2. Section 01 3516: Alteration Project Procedures, for building alterations.
 3. Section 01 4500: Quality Control, for cutting and patching operations related to inspection and testing.
 4. Section 02 4119: Selective Demolition, for demolition of selected portions of the building for alterations.
 5. Refer to individual Sections for specific requirements and limitations applicable to cutting and patching.
 6. Divisions 22, 23 and 26, for mechanical and electrical requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.2 SUBMITTALS

- A. Proposal for Cutting and Patching: Where cutting and patching involves structural elements, submit for approval a proposal describing procedures. Include the following information in the proposal:
1. Describe extent of cutting and patching required, how it will be performed, and why it cannot be avoided.
 2. Indicate changes to structural elements, and changes in appearance of visual elements. Include structural calculations.
 3. List products proposed for use and entities that will perform the Work.
 4. Indicate dates that work will be performed, duration of the Work, and when work will be uncovered for Architect's observation.
 5. List utilities that cutting and patching work will affect.
 6. Submit cost estimate and secure Architect's approval of cost estimate and type of reimbursement before proceeding with cutting and patching

1.3 QUALITY ASSURANCE

- A. Structural Work: Do not cut and patch structural elements in a manner that would change their load carrying capacity or load deflection ratio.
1. Obtain approval before cutting and patching structural elements.
- B. Do not cut and patch operating elements in a manner that would reduce their capacity to perform as intended, cause increased maintenance, or decreased operational life or safety.
- C. Do not cut and patch exposed elements of construction that in the Architect's opinion would reduce the visual aesthetic qualities, or result in visual evidence of cutting and patching.
1. Remove and replace construction cut and patched in a visually unacceptable manner.

1.4 WARRANTY

- A. Cut and patch construction using methods and with materials in such a manner as to not void any warranties required or existing.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Use new materials identical to existing materials.
- B. For exposed surfaces where identical materials are not available, use materials that visually match existing adjacent surfaces as nearly as possible.
- C. Use materials whose installed performance is equal or better to that of existing materials.

PART 3 EXECUTION

3.1 INSPECTION

- A. Inspect existing conditions, including elements subject to movement or damage during cutting, excavating, patching, and backfilling.
- B. After uncovering Work, inspect conditions affecting installation of new Work.
- C. Discrepancies: If uncovered conditions are not as anticipated, immediately notify Architect and secure direction before proceeding further.
 - 1. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Provide temporary support of work to be cut, including shoring and bracing as required to maintain structural integrity of Work.
- B. Protect existing construction during cutting and patching to prevent damage.

3.3 GENERAL PERFORMANCE

- A. Use skilled workers trained and experienced in necessary crafts and familiar with requirements and methods required to restore surfaces to their original condition.
- B. Provide dust proof barriers where necessary to protect existing surfaces.

3.4 CUTTING

- A. Perform cutting and demolition by methods that will provide the least damage to other portions of Work.
- B. Prior to cutting existing work, locate concealed utilities to eliminate possibility of service interruption or damage.
- C. Cut through concrete or masonry with a carborundum masonry saw or diamond-core drill.

- D. When masonry construction must be pierced, furnish and install a steel pipe sleeve in opening and grout in place neatly.
 - 1. Leave grout surface to match existing finish.
 - 2. Fabricate sleeve one inch in diameter larger than pipe or insulation.
 - 3. Pack between sleeve and pipe with waterproof sealant.
 - 4. At penetrations of fire-resistant rated walls, partitions, ceiling, or floor construction, completely seal voids with fire-resistant rated materials as require to maintain assembly of fire-resistant rating of penetrated element, or as required by Building Code.

3.5 PATCHING

- A. Perform fitting and adjusting of products to provide a finished installation complying with tolerances and finishes specified for type of construction involved.
- B. Where replacement of equipment and fixtures is required, restore existing plumbing, heating, ventilation, air-conditioning, electrical, and similar systems to full operational condition.
- C. Refinish surfaces to match existing adjacent finish, patching with seams that are durable and as invisible as possible.
 - 1. Where possible, inspect and test patched area to demonstrate integrity of seam.
 - 2. For continuous surfaces, refinish to nearest intersection or natural break.
 - 3. For assembly, refinish entire unit.
 - 4. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining work in manner that will eliminate evidence of patching and refinishing.
- D. When finished surfaces are cut so that smooth transition with existing or new work is not possible, submit to Architect, for approval, recommendation for terminating surface along straight line at natural line of division.
 - 1. Where change of plane of 1/4 inch or more occurs, submit to Architect, for approval, recommendation for providing smooth transition.

3.6 CLEANING

- A. Clean areas and spaces where cutting and patching work is performed.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes requirements for maintaining Project buildings and site in a standard of cleanliness during construction period.
- B. Related Sections:
 - 1. Section 01 500: Temporary Facilities and Control, for removal of temporary facilities.
 - 2. Section 01 7419: Construction Waste Management
 - 3. Section 01 7700: Closeout Procedures.

1.2 QUALITY ASSURANCE

- A. In addition to standards described in this Section, comply with applicable requirements of governmental agencies having jurisdiction.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Provide personnel, equipment, and materials as needed to maintain specified standard of cleanliness.

2.2 COMPATIBILITY

- A. Use only cleaning materials and equipment that are compatible with surfaces being cleaned, as recommended by manufacturer of material.

PART 3 EXECUTION

3.1 PROGRESS CLEANING

- A. General: Do not allow accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
 - 1. Completely remove all scrap, debris, and waste material from job site and dispose of in a legal manner.
 - 2. Provide adequate storage for items and waste to be removed from job site, observing requirements for fire and environmental protection.
- B. Storage Areas: Maintain stored items in an orderly arrangement allowing maximum access, which does not impeding traffic or drainage.
 - 1. Inspect arrangement of stored materials weekly. Restack, tidy, or otherwise service arrangements.
- C. Site and Structures:
 - 1. Inspect site and structures weekly, and more often if necessary, and pick up all scrap, debris, and waste material.
 - a. Remove such items to place designated for their storage. Maintain site in a neat and orderly condition.

2. Sweep interior spaces clean as often as necessary to maintain a clean environment.
 - a. Clean, for purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a hand-held broom.
3. As required prior to installation of succeeding materials, clean structures or applicable portions thereof to degree of cleanliness recommended by manufacturer of succeeding material.
4. Following installation of finish floor materials, clean finish flooring daily at times while Work is being performed in space in that finish materials are installed to keep floor free from foreign material that may be injurious to finish.

3.2 FINAL CLEANING

- A. "Final Cleaning," for purpose of this Section, and except as may be specifically provided elsewhere, shall be interpreted as meaning level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.
- B. Prior to Substantial Completion, remove from Project site all tools, surplus materials, equipment, scrap, debris, and waste.
- C. Broom clean paved areas on site and public paved areas at approaches to site.
- D. Exterior Surfaces:
 1. Visually inspect exterior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
 2. Hose down entire exterior surfaces of structure if necessary to achieve a uniform degree of cleanliness.
- E. Interior Surfaces:
 1. Visually inspect interior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
 2. Remove paint droppings, spots, and stains.
 3. Clean both sides of glass surfaces.
 4. Polished surfaces: Apply polish recommended by manufacturer of material to be polished.

END OF SECTION

PART 1 GENERAL

1.1 WASTE MANAGEMENT GOALS

- A. Waste materials produced as a result of this project shall be reused or recycled to minimize impact of construction waste on landfills and to minimize expenditure of energy and cost in fabricating new materials.

1.2 WASTE MANAGEMENT PLAN

- A. Reuse or recycle debris generated as a result of work performed on project when practicable and cost effective.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 ON-SITE MATERIALS SORTING AND STORAGE DURING CONSTRUCTION

- A. Verify recycling facilities or waste processor requirements for preparation of materials to be accepted and to what degree materials can be contaminated.
- B. Recycle the following waste materials:
 - 1. Wood
 - 2. Metals (ferrous and non-ferrous)
 - 3. Cardboard
 - 4. Drywall
 - 5. Masonry and Concrete
 - 6. Office paper
- C. Coordinate with local hauler to provide separate containers for recycled materials listed above.
 - 1. Subcontractors shall follow source separation requirements for each waste, and use appropriate on-site container for each type of waste material.
 - 2. Provide separate containers for non-recyclable materials.
- D. Rebates: Paid or credited by hauler/recycler to Contractor.
- E. Inform field personnel and subcontractors about recycling program, and continuously monitor program to verify proper source separation and to avoid contamination of recyclable materials.
- F. Recycling Processors and Facilities:
 - 1. Comprehensive list of recycling facilities in Portland Metro are available from local building permit office or by contacting Metro at 503-234-3000.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for Contract closeout including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Project record documents.
 - 3. Operation and maintenance manuals.
 - 4. Warranties.
 - 5. Starting and Adjusting.
 - 6. Instruction of Owner's personnel.
- B. Closeout requirements for specific construction activities are included in the appropriate Sections.
- C. Related Sections:
 - 1. Section 01 2900: Payment Procedures, for requirements for Applications for Payment for Substantial and Final Completion.
 - 2. Section 01 5000: Temporary Facilities and Control, for removal of temporary facilities.
 - 3. Section 01 7400: Cleaning, for final cleaning requirements.

1.2 SUBSTANTIAL COMPLETION

- A. Prior to requesting inspection for determining date of Substantial Completion, complete the following.
 - 1. Prepare a list of items to be completed and corrected (Contractor's Punch List), the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise the Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, construction photographs, damage or settlement surveys, property surveys, and similar final record information.
 - 6. Deliver tools, spare parts, extra stock, and similar items.
 - 7. Make final changeover of permanent locks and transmit keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 8. Complete startup testing of systems and instruction to Owner's personnel.
 - 9. Submit test/adjust/balance records.
 - 10. Terminate and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.
 - 11. Complete final cleanup requirements required in Section 01 7400.
 - 12. Touch up and otherwise repair and restore marred, exposed finishes, including touchup painting.
- B. Inspection: Submit a written request for inspection for Substantial Completion.
 - 1. On receipt of request, the Architect will either proceed with inspection, or without completing inspection, advise the Contractor that based on limited inspection, the construction is not sufficiently complete for Substantial Completion.

2. Architect will prepare the Certificate of Substantial Completion after inspection, or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate can be issued.
 - a. Architect will reinspect when assured by Contractor that Work identified in previous inspection has been completed and corrected.
 - b. If additional inspections are required, the Owner will charge the Contractor to reimburse Architect for time and expenses.
 - c. Results of the completed inspection will form the basis of requirements for final acceptance.
3. Owner will allow Contractor no longer than 30 calendar days from Date of Substantial Completion to remedy deficiencies.

1.3 FINAL COMPLETION

- A. Prior to requesting inspection for determining date of Final Completion, complete the following.
 1. Submit a final Application for Payment, according to requirements of Section 01 2900.
 2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Inspection: Submit a written request for final inspection for acceptance.
 1. On receipt of request, the Architect will either proceed with inspection, or advise the Contractor of unfulfilled requirements.
 2. Architect will prepare the final Certificate for Payment after inspection, or will notify Contractor of construction that must be completed or corrected before certificate can be issued.
 - a. Architect will reinspect when Work identified in previous inspection as incomplete is completed and corrected.
 - b. If additional inspections are required, the Owner will charge the Contractor to reimburse Architect for time and expenses.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.

- d. Name of Contractor.
- e. Page number.

1.5 PROJECT RECORD DOCUMENTS

- A. General: Do not use Project Record Documents for construction purposes; protect from deterioration and loss.
- B. Record Drawings: Maintain and submit one set of black line white prints of Contract Documents or Record CAD Drawings required.
 - 1. Mark the Record Drawings to show the actual installation and construction where installation or construction varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is installer, subcontractor, or similar entity, to prepare the marked-up Record Drawings.
 - a. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - 2. Mark record sets with erasable red-colored pencil, clearly describing change by graphic line and note. Use other colors to distinguish between changes for different categories of the Work at the same location.
 - a. Call attention to entries by a "cloud" drawn around areas affected.
 - 3. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - a. Conversion of Schematic Layouts: Show on Record Drawings, by dimension accurate to within one inch, centerline of each run of items shown schematically on Drawings. Clearly identify item by accurate note such as "cast iron drain", "galv. water", and the like. Show, by symbol or note, vertical location of item ("under slab", "in ceiling plenum", "exposed", and the like). Relate by identification descriptive to Specifications.
 - b. Show final location of electrical junction boxes and outlets, telephone and data outlets, supply and return registers, and like.
 - 4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
 - 5. Identify and date each Record Drawings; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets with identification.
- C. Record Specifications: Submit one complete copy of Project Specifications, including addenda and contract modifications.
 - 1. Mark copy to indicate the actual product installation where installation or from that indicated in Specifications, addenda, and contract modifications.
 - 2. Mark copy with proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - 3. Note related Change Orders and other modifications, where applicable.

- D. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind miscellaneous records and identify each in same format as specified for Operation and Maintenance Manuals, ready for continued use and reference.
1. One set of evidence of compliance with requirements of governmental agencies having jurisdiction including, but not necessarily limited to:
 - a. Certificates of Inspection.
 - b. Certificates of Occupancy.
 2. One set of certificates of insurance for products and completed operations.
 3. One set of evidence of payment and release of liens.
 4. One copy of list of Subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reached for emergency service at all times including nights, weekends, and holidays.

1.6 OPERATION AND MAINTENANCE MANUALS

- A. Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:
1. Operation Data: Include emergency instructions and procedures, system and equipment descriptions, operating procedures, and sequence of operations.
 2. Maintenance Data: Included manufacturer's information, list of spare parts, maintenance procedures, maintenance and service schedules for preventive and routine maintenance, and copies of warranties and bonds.

1.7 WARRANTIES

- A. Submit one set of warranties, organized into an orderly sequence based on the table of contents of the Project Manual, in same format as specified for Operation and Maintenance Manuals.

PART 2 PRODUCTS (Not applicable)

PART 3 EXECUTION

3.1 STARTING AND ADJUSTING

- A. Prior to request for certification of Substantial Completion, start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment and operating components for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.2 DEMONSTRATION AND TRAINING

- A. Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Provide instructors experienced in operation and maintenance procedures.
 - 2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
 - 3. Schedule training with Owner with at least 7 days' advance notice.
 - 4. Coordinate instructors, including providing notification dates, times, length of instruction, and course content.

- B. Include instruction for system design and operational philosophy, review of documentation, operations, adjustments, troubleshooting, maintenance, and repair.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected building equipment and fixtures.
2. Demolition and removal of selected portions of a building or structure.
3. Demolition and removal of selected site elements.
4. Repair procedures for selective demolition operations.

B. Related Sections:

1. Section 01 1100 Summary of Work, for use of the premises and Owner occupancy during construction.
2. Section 01 3516: Alteration Project Procedures, for transition of new and existing construction after completion of selective demolition.
3. Section 01 5000: Temporary Facilities and Controls, for temporary construction, environmental protection measures, and security at Owner occupied areas.
4. Section 01 7329: Cutting and Patching, for cutting and patching procedures.
5. Division 22: Plumbing, for demolishing, cutting, patching, or relocating plumbing items.
6. Division 23: Heating, Ventilating and Air-conditioning, for demolishing, cutting, patching, or relocating HVAC items.
7. Division 26: Electrical, for demolishing, cutting, patching, or relocating electrical items.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose off-site, unless indicated to be removed and salvaged, or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction and deliver to Owner.
- C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Existing construction items of construction to remain without removal.

1.3 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain on Owner's property, demolished materials become Contractor's property and shall be removed from Project site. Do not burn or bury materials on site.

1.4 SUBMITTALS

- A. Schedule of Selective Demolition Activities: Indicate sequence of demolition and removal work, interruption of utility services, coordination for shutoff, capping, and continuation of utility services, use of elevator and stairs, locations of temporary partitions and means of egress, and coordination of Owner's continuing occupancy of portions of existing building.
- B. Utility Survey: Accurately record actual locations of capped utilities.

1.5 QUALITY ASSURANCE

- A. Standards: Comply with the following:
 - 1. ANSI A10.6: "Safety Requirements for Construction and Demolition."
 - 2. NFPA 241: "Safeguarding Construction, Alteration, and Demolition Operations."
 - 3. Applicable local codes for demolition work, safety of structure, and dust control.
- B. Obtain required permits from governing authorities.
- C. Comply with governing EPA notification regulations before beginning of demolition operations.
- D. Comply with hauling and disposal regulations of authorities having jurisdiction.
- E. Conduct predemolition conference at Project site.

1.6 PROJECT CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct demolition so Owner's operations will not be disrupted. Provide not less than 72 hours notice to Owner of activities that will affect Owner's operations.
 - 1. Do not disable or disrupt building fire or life safety systems without prior written notice to the Owner.
- B. Maintain access to existing walkways, corridors, or other occupied or used facilities. Do not close or obstruct egress width to exits.
- C. Owner assumes no responsibility for condition of areas to be selectively demolished.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. Hazardous materials will be removed by Owner before start of Work.
 - 2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Utility Service: Notify affected utility companies of selective demolition before starting work and comply with their requirements for maintaining service, and disconnecting existing services, where required.
 - 1. Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.
 - 2. Maintain fire protection facilities in service during demolition operations.

1.7 SCHEDULING

- A. Schedule Work to coincide with new construction.

PART 2 PRODUCTS

2.1 REPAIR MATERIALS

- A. Use repair materials identical to existing materials, or materials that visually match existing surfaces if identical materials are not available.

- B. Comply with material and installation requirements specified in individual Specification Sections.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Prior to start of Work, examine work to be removed and work to remain to determine nature of work and conditions under which selective demolition will be conducted.
 - 1. Make necessary probes to determine extent and kind of protection required.
 - 2. When applicable, verify that utilities have been disconnected and capped.
 - 3. Where existing conditions are found to be conflict with representations of Contract Documents, submit written notification and request clarification.
 - a. Do not perform Work related to conflicting conditions until clarification is obtained.
- B. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.

3.2 PREPARATION

- A. Utilities: Locate, identify, disconnect, and seal or cap off utilities serving area to be demolished. Mark location of existing utilities to remain.
- B. Provide, erect, and maintain temporary barriers at locations indicated, or as required to separate the public and occupied areas from areas of Work.
- C. Erect and maintain weatherproof closures for exterior openings.
- D. Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
- E. Protect existing materials which are not to be demolished or removed.
- F. Provide and maintain shoring, bracing, or structural support to prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction to be demolished.

3.3 SELECTIVE DEMOLITION

- A. Conduct demolition to minimize interference with adjacent and occupied building areas.
- B. Demolish and remove existing construction only to the extent required by new construction and as indicated.
- C. Demolish in an orderly and careful manner. Protect existing supporting structural members.
- D. Cease operations immediately if structure appears to be in danger. Notify Architect. Do not resume operations until directed.
- E. Removed and Salvaged Items: Clean, pack or crate with identification marked on containers, store in a secure area until delivery to Owner, and transport to Owner's storage area.

- F. Removed and Reinstalled Items: Clean and repair to functional reuse, pack or crate with identification marked with identification, protect from damage during storage, and reinstall in locations indicated. Comply with requirements for new materials and equipment.
- G. Existing Items to Remain: Protect against damage and soiling during selective demolition. When permitted by Architect, items may be removed to suitable storage and reinstalled in their original locations after demolition operations are complete.
- H. Promptly repair damage to adjacent construction caused by selective demolition. Perform patching work in accordance with Section 01 7329, Cutting and Patching.
- I. Remove demolished materials from site as work progresses.
- J. Do not burn demolished materials on site.
- K. Transport demolished materials off Owner's property and legally dispose of them.
- L. Upon completion of work, leave areas in clean condition. Remove temporary partitions, barriers, and construction.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete forming
2. Concrete reinforcing.
3. Concrete accessories.
4. Concrete footings and foundation walls.
5. Floor slabs-on-grade.
6. Vapor Emission Control System.

B. Related Sections:

1. Section 01 4500: Quality Control, for special inspection and independent testing requirements.
2. Section 09 6517: Linoleum Flooring, for floor slab moisture requirements affecting Work of this Section.
3. Section 09 6813: Tile Carpeting, for floor slab moisture requirements affecting Work of this Section.
4. Section 32 1313: Concrete Paving.
5. Structural Drawings: Structural Notes.

1.2 PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION

- A. Anchor bolts to be embedded in concrete, supplied under provisions of Section 05 5000: Metal Fabrications.

1.3 SUBMITTALS

A. Product Data:

1. Submit manufacturers product information on concrete accessory materials, including sealer, hardener, and their VOC content.
 - a. Provide schedule of specific areas to receive each type of product specified for interior slab-on-grade treatment, such as sealers, hardeners, and Vapor Emission Control System. Identify name of each product proposed for use.

- B. Reinforcement Shop Drawings: Submit steel reinforcing placement drawings prior to fabrication of reinforcing.

1. Comply with requirements in ACI 315.
2. Identify and dimension each type of reinforcing bar.

- C. Mix Design Data: Submit a mix design formula, with supporting test data per ACI, at least 10 days prior to delivery of concrete.

- D. Test Reports: Submit copies of laboratory and field test reports for concrete work.

1. Submit copies of inspection and independent testing reports required in Section 01 4500, Quality Control.

- E. Certificates: Submit letter from concrete supplier that concrete delivered meets specified requirements.

- F. Batch Ticket: Provide a batch weight ticket with each truck for inspection agency.
 - 1. Comply with requirements of ASTM C 94 in Article 16 Batch Ticket Information.
- G. Reinforcement Test Reports: Submit two copies of mill test reports on grade 60 reinforcing prior to placing concrete.
- H. Documentation that application of Vapor Emission Control System for concrete slabs-on-grade has been certified by manufacturer of product.

1.4 QUALITY ASSURANCE

- A. Reinforcing Steel Standards:
 - 1. CRSI "Manual of Standard Practice"
 - 2. ACI 318, Building Code Requirements for Reinforced Concrete, Commentary on Building Code Requirements for Reinforced Concrete.
 - 3. ASTM A615 and Supplement #1.
 - 4. ASTM A82, Cold Drawn Steel Wire for Concrete Reinforcement.
- B. Mix Design Qualifications: Employ testing laboratory or concrete supplier acceptable to Architect to perform materials evaluation, testing, and design of concrete mixes.
- C. Plant Certification: Ready Mix Plant to comply with NRMCA certification regulations.
 - 1. Ready Mix Plant and Equipment: Comply with requirements of ASTM C 94.
- D. Test concrete slabs-on-grade for moisture vapor emissions prior to application of finish floor materials as described in Sections 09 6517 and 09 6813.
 - 1. Owner will engage an Independent Testing Laboratory in accordance with requirements of Section 01 4500.
 - 2. Provide test results to installers of work of Sections 09 6517 and 09 6813.
- E. Application of moisture vapor emission and alkalinity barrier to be certified by manufacturer of Vapor Emission Control System.

1.5 REGULATORY REQUIREMENTS

- A. Concrete mix design and placement requires special inspection per State Building Code Section 1701.

1.6 PRE-INSTALLATION CONFERENCE

- A. Convene a pre-installation conference within two weeks prior to commencing Work of this section.
- B. Review installation procedures, testing procedures, and coordination required with related Work, concrete design mixes, concrete admixtures, including placement of concrete on vapor retarder and application of Vapor Emission Control System.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver reinforcement to the job site bundled, tagged, and marked.
 - 1. Tag to indicate bar size, lengths, and other information corresponding to markings shown on Shop Drawing placement diagrams.

- B. Store reinforcement in a manner to prevent damage and accumulation of dirt and excessive rust.

1.8 SITE CONDITIONS

A. Temperature and Weather Requirements:

1. Do not place concrete when temperature or weather will affect performance or appearance of concrete.
2. Maximum wind velocity for unprotected floor slabs, stairs, ramps, and walks: 15 mph.
3. Minimum Ambient Air Temperature: 40 degrees F.
4. No precipitation expected within 8 hours for unprotected concrete surfaces.

B. Substrate Requirements:

1. Do not place concrete on muddy or frozen soil.
2. Remove water and ice from footing trenches.
3. Remove ice from formed surfaces.
4. Remove water and ice from underslab vapor retarder.

PART 2 PRODUCTS

2.1 FORM MATERIALS

A. Forms for Exposed Concrete: Plywood, metal, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces.

1. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on Drawings.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

C. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish ties that, when removed, will leave holes not larger than 1 inch in diameter in concrete surface.

2.2 REINFORCEMENT

A. Reinforcing Bars: Intermediate grade steel conforming with "Specifications for Billet-Steel Concrete Reinforcing Bars", ASTM A 615, Grade 60, deformed, unless specifically noted as grade 40.

B. Weld Type Reinforcing Bars: ASTM A 706, Grade 60.

C. Reinforcing Accessories:

1. Chairs for Support of Rebar: "Concrete Brick," Precast concrete or fiber-reinforced concrete, of greater strength than concrete; do not use steel devices over vapor retarder.

2. Reinforcing Tie Wire: ASTM A 82, 16 gauge, double annealed iron wire.

D. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or II.

1. Fly Ash: ASTM C 618, Class F or Class C.

B. Aggregates: ASTM C 33.

C. Water: Clean, free of oils, acids, organic material.

D. Admixtures:

1. Air-Entraining: ASTM C 260.

2. Chemical Admixture: ASTM C 494, Type A water reducing or Type D water reducing and retarding.

2.4 ACCESSORY MATERIALS

A. Vapor Emission and Control System: Concrete sealer, hardener and curing compound for interior floor slabs to receive applied floor finish.

1. Product: Subject to compliance with requirements, provide one of the following:

a. CS 2000 Spray Applied System, by Creteseal (800-278-4273).

2. Provide manufacturer's standard 10 year warranty for the floor covering system covering labor and materials necessary to repair, or replace if repairs cannot be made, the floor finish covering failure due to substrate originated moisture and/or moisture-born contaminants.

B. Curing Compound: Sodium Silicate, for exposed concrete floor slabs where vapor emission and control system is not used.

1. Eucosil; Euclid Chemical.

2. Day-Chem Sil-Cure (J-13); Dayton Superior Corporation.

3. Sonosil; Sonneborn-Chemrex.

C. Nonmetallic Nonshrink Grout:

1. Standard: ASTM C 1107.

2. Acceptable Compounds:

a. Burke: Nonmetallic Grout.

b. Euclid Chemical Co.: NS Grout.

c. Master Builders: Masterflow 713 or 928.

d. W.R. Meadows: Sealtight 588 Precision Grout.

e. Five Star Products, Inc.: Five Star Grout.

D. Bonding Agent:

1. Standards: ASTM C 932, ASTM C 881 and ASTM C 631.

2. Acceptable Agents:
 - a. Hornweld by A. C. Horn.
 - b. Weld-crete by Larsen.
 - c. Thorobond by Thoro System Products.
 - d. Sonocrete or Sonobond by Sonneborn.

E. Patching Compound:

1. Acceptable Compounds: Epolith Patcher or Sonopatch by Sonneborn.

F. Concrete curing membrane:

1. Reinforced Laminated Paper for Traffic Areas: ASTM C 171, Orange Label Sisalkraft by Fortifiber Corp.
2. Reinforced Laminated Paper for Nontraffic Areas: ASTM C 171, Sisalkraft SK-10 by Fortifiber Corp.

G. Curing Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet, or synthetic fiber mat complying with AASHTO M-171, such as the following:

1. Synthetic Fiber Mat for Traffic Areas: Transguard, by Armorlon, a Division of Reef Industries, Inc.

H. Fibrous Reinforcing:

1. Multifilament synthetic nylon fiber manufactured as a secondary reinforcing material for concrete.
2. Manufacturer: Nycon, Inc.; Nycon Synthetic Fiber.

I. Aggregate Base Under Building Slabs-On-Grade: As specified in Section 31 2000.

J. Vapor Retarder: Specified in Section 07 2616.

K. Self-Expanding Strip Waterstops: Manufactured rectangular or trapezoidal strip, sodium bentonite or other hydrophylic material for adhesive bonding to concrete.

1. Volclay Waterstop-RX; Colloid Environmental Technologies Co.
2. Conseal CS-231; Concrete Sealants Inc.
3. Hydrotite; Greenstreak.
4. Mirastop; Mirafi Moisture Protection, Div. of Royal Ten Cate (USA), Inc.

2.5 MIXING

A. Proportioning: Comply with ACI 211.1

1. Proportion concrete in accordance with ACI 301, Article 3.8.

B. Proportion Adjustments:

1. Mix designs may be adjusted when material characteristics, site conditions, weather, test results or other circumstances warrant.
 - a. Submit proposed revised concrete mixes to Architect.

C. Ready Mix Plant Mixing Procedures: Comply with ASTM C 94.

1. Mix full load for 3 minutes at high speed upon arrival at site.
2. Mix additional 5 minutes after adding water.

D. Design Mix Requirements:

1. Maximum Coarse Aggregate Size: 3/4 inch.
2. Maximum Slump for Footings and Floor Slabs: 4 inches + 1/2 to - 1 inch.
3. Maximum Slump for Walls: 3 inches + 1/2 to - 1 inch.
4. Entrained Air: 5 percent + or - 1-1/2 percent; use only for exterior exposed concrete, unless otherwise indicated.
5. Minimum Compressive Strength:
 - a. Foundations, Slabs-on-grade: $f_c = 3,000$ psi in 28 days.
 - b. Site Concrete and Pads: $f_c = 3,000$ psi in 28 days, air entrained.
6. Probability of Test Falling Below Specified Strength: 1 out of 5.
7. Maximum Pozzolan (Fly Ash) Content: 15 percent of weight of cementitious material.
8. High-Range, Water Reducing Admixture: ASTM C 494, Type F. Use for interior slabs-on-grade to achieve specified water/cement ratio.
9. Water/Cement Ratios:
 - a. 0.42 for interior slabs-on-grade.
 - b. 0.50 for other concrete.
10. Fibrous Reinforcing: Add fibrous reinforcing to concrete mix at ready-mix plant for concrete flatwork including slabs-on-grade, elevated slabs, sidewalks, and driveways at rate of 1 pound of fiber per cubic yard of concrete.

2.6 FABRICATION

A. Shop Fabrication of Steel Reinforcing: Comply with CRSI, Manual of Standard Practice, MSP-1, ACI 301, ACI 315, and ACI 318.

1. Comply with ACI 318, Chapter 7 for bending dimension.

PART 3 EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork in accordance with ACI 301.
- B. Construct formwork so concrete structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 1. Class A, 1/8 inch, for concrete surfaces exposed to view.
 2. Class C, 1/2 inch, for other concrete surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Chamfer exterior corners and edges of permanently exposed concrete, unless otherwise shown or indicated.

- F. Coat contact surfaces of forms with form-release agent, according to manufacturer's instructions before placing reinforcement.
- G. Leave formwork for structural elements in place until concrete has achieved 28-day design compressive strength.
- H. Clean and repair surfaces of forms to be reused in Work and apply new form- release agent.
 - 1. Do not use patched forms for exposed concrete surfaces unless approved by Architect.
- I. Anchor Bolts:
 - 1. Set anchor bolts for structural plates with anchor bolts double nutted to plywood or steel templates.
 - 2. Set anchor bolts for equipment with anchor bolts double nutted to templates furnished by equipment manufacturer.

3.2 AGGREGATE BASE AND VAPOR RETARDER

- A. Place aggregate base under building slabs-on-grade as specified in Section 31 2000.
 - 1. Grade aggregate base to drain to top of perimeter foundation wall footings.
 - 2. Insert drainage weeps in foundation wall to drain to exterior of building foundations.
- B. Place, protect, and repair vapor retarder according to requirements specified in Section 07 2616.

3.3 INSTALLATION OF REINFORCING STEEL

- A. Comply with CRSI, Manual of Standard Practice, MSP-1.
- B. Cleaning Reinforcing: Remove loose rust, mill scale, earth, and other materials which reduce or destroy bond with concrete.
- C. Support reinforcing to prevent displacement with metal chairs, runners, bolsters, spacers, and hangers.
- D. Set wires so ends are directed into concrete, not toward exposed concrete surfaces.
- E. Stagger reinforcing bar splices 36 inches minimum at alternate bars.
- F. Install welded wire fabric in long lengths, lapping edges at least one mesh plus two inches unless otherwise noted.
- G. Lap continuous bars in accordance with ACI 318, Chapter 12, Class B, unless otherwise noted.
- H. Placement tolerance not to exceed 1/4 inch plus or minus.
- I. Construct hooked reinforcing to comply with ACI 318, Section 7.1 to 7.3.
- J. Notify Architect of items interfering such as conduit, pipes, inserts, sleeves, etc., and obtain written approval on procedure before placement of concrete.
- K. Minimum Concrete Cover for Reinforcing Bars: Comply with ACI 318, Chapter 7, Paragraph 7.7, unless otherwise noted.

3.4 CONCRETE PLACEMENT

- A. Comply with ACI 301 and 304, placing concrete in a continuous operation within planned joints or sections.
- B. Consolidate placed concrete using mechanical vibrating equipment with hand rodding and tamping.
- C. Work concrete around reinforcement, embedded items and forms.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated item. Scream, tamp, and trowel-finish concrete surfaces.

3.5 FINISHING

- A. Concrete Surfaces Exposed to Public View:
 - 1. Provide smooth form finish for concrete.
 - 2. Comply with ACI 301, paragraph 10.2.2.
 - 3. Remove fins and projections.
 - 4. Patch tie holes and defects.
- B. Floated Slab Finish:
 - 1. Provide floated finish for slab surfaces to receive washed, troweled, and broomed finish.
 - 2. Comply with ACI 301, paragraph 11.7.2.
 - 3. Begin floating when water sheen has disappeared and surface has stiffened sufficiently to permit float finishing.
 - 4. Check surface plane with a 10 foot straightedge at two or more angles during or after first floating.
 - 5. Level to flatness of 1/4 inch in 10 feet.
 - 6. Refloat immediately to a uniform sandy texture.
- D. Troweled Slab Finish:
 - 1. Provide troweled finish for interior slab surfaces exposed for walking, to receive resilient or carpet floor covering, or to receive ceramic tile flooring.
 - 2. Comply with ACI 301, paragraph 11.7.3.
 - 3. Provide a floated finish as specified above.
 - 4. Power trowel slab to smooth surface free of defects except minor trowel marks.
 - 5. Eliminate trowel marks by hand troweling slab when surface is sufficiently hard.
 - 6. Perform final hand troweling when trowel rings as trowel is moved over slab surface.
 - 7. Trowel to flatness of 3/16 inch in 10 feet.
 - 8. Grind slab surfaces or fill with underlayment to remove defects of sufficient magnitude to show through intended floor covering.
- E. Broom Slab Finish:
 - 1. Provide a broom finish for exterior walks, stair treads, slabs and ramps.
 - 2. Comply with ACI 301, paragraph 11.7.4.
 - 3. Provide a floated finish as specified above.
 - 4. Draw a broom or burlap belt across surface to give slab a coarse transverse scored texture.

F. Joint Finishing:

1. Tool radius exterior slab, walk, ramp, and curb edges.
2. Cut or form interior floor slab crack control joints.

G. Horizontal Surface Finish Tolerances: Finish concrete horizontal surfaces as specified in ACI 301, Articles 11.7, 11.8 and 11.9

1. For floors to receive resilient flooring and carpeting, provide concrete smooth, level, and without more than 1/8 inch in 10 ft. variation from level.

3.6 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install at locations indicated or as approved by Architect.

1. Continue reinforcement across construction joints, unless otherwise indicated.
2. Form from preformed galvanized steel, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
3. Locate joints for beams, slabs, joists, and girders in the middle third of spans.
4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
5. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated, or approved. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:

1. Grooved Joints:

- a. Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch.
- b. Repeat grooving of contraction joints after applying surface finishes.
- c. Eliminate groover tool marks on concrete surfaces.

2. Sawed Joints:

- a. Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades.
- b. Cut 1/8-inch-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealers, specified in Section 07 9200, Joint Sealants, are indicated.
2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

- E. Dowel Joints: Install dowel sleeves and dowels or dowel bar and support assemblies at joints where indicated.
 - 1. Use dowel sleeves or lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.7 WATERSTOPS

- A. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, bonding or mechanically fastening and firmly pressing into place. Install in longest lengths practicable.

3.8 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with the following:
 - 1. Cold Weather Protection: ACI 306.1.
 - 2. Hot Weather Protection: ACI 305R.
- B. Moisture Curing: Keep surfaces continuously moist for not less than 7 days with the following materials
 - 1. Water.
 - 2. Continuous water-fog spray.
 - 3. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12 inch lap over adjacent absorptive covers
- C. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than 7 days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - 1. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or specified curing compound.
- D. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's instructions. Maintain continuity of coating and repair damage during curing period.

3.9 INTERIOR FLOOR SLAB TREATMENT

- A. Vapor Emission Control System: Apply to interior concrete floor slabs-on-grade to receive resilient flooring, carpeting, or other applied coatings.
 - 1. Apply on freshly placed concrete after final finishing and soft cutting to waterproof, seal, harden, and cure concrete in accordance with manufacturer's installation instructions.
 - 2. Field Quality Control: Warranty requires application to be certified by manufacturer's technical person on-site observing application of Vapor Emission Control System.

3.10 FIELD QUALITY CONTROL

- A. Do not place concrete or reinforcement in footing forms until Architect or his representative has examined compacted soil and aggregate materials within forms.

- B. Do not place concrete until Architect or his representative has examined formwork, reinforcing steel, and condition of vapor retarder.
 - 1. Notify Architect 24 hours prior to concrete placement for inspection of reinforcing.
 - 2. Adjusting Reinforcing: Adjust location of reinforcing as required.
- C. Vapor Emission Control System: Manufacturer's technical person for Vapor Emission Control System to observe application of system on-site and certify application as being in conformance with manufacturer's written instructions and terms of warranty for product.
- D. Test Requirements:
 - 1. When special Inspection is required by Building Code, Owner will employ an Independent Testing Laboratory to evaluate concrete delivered to and placed at site.
 - a. Notify Independent Testing Laboratory 24 hours prior to delivery and placement of concrete.
 - 2. Test composite samples according to ASTM C 172.
 - 3. Slump Test: Test at point of placement complying with ASTM C 143.
 - a. Concrete for Floor Slabs: Perform one slump test for each truck load of ready mixed concrete.
 - b. Other Concrete: Perform not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 - 4. Air Content Test: Perform one test for each set of composite sample complying with ASTM C 231.
 - 5. Compressive Strength Tests: Make one set of 3 specimens for each day of structural concrete pouring or each 50 cubic yards or fraction thereof for each class of concrete,
 - a. Test one specimen in accordance with ASTM C 39 after curing 7 days, two specimens after curing 28 days, unless first specimen tested at 28 days does not meet specified compressive strength, in which case retain one specimen for testing after 35 days or as directed by Architect.
 - 6. Batch Ticket:
 - a. Receive a batch weight ticket from each truck; batch ticket to comply with requirements of ASTM C 94 in Article 16 for Batch Ticket Information.
 - b. Verify water/cement ratio.
 - 1) No water may be added if load is at specified ratio.
 - 2) Reject truck if ratio does not conform.

3.11 REPAIRS AND PROTECTION

- A. Surface Repairs for Exposed Concrete:
 - 1. Thoroughly clean, dampen with water and brush-coat area to be patched with Bonding Agent.
 - 2. Fill honeycomb voids and rock pockets with patching compound.
 - 3. Compact in place and screed as recommended by patching compound manufacturer.
 - 4. Finish to match adjoining work.
 - 5. Strike off excess mortar at surface.

6. If defects in color and texture of surface cannot be repaired, remove and replace concrete.
- B. Physical Barrier Protection:
1. Barricade area containing fresh concrete slabs, stairs, ramps and walks for 24 hours minimum.
 2. Cover fresh concrete with plywood where exposed to public, pedestrian, and animal traffic.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes metal fabrications as follows, but not limited to:
 - 1. Steel framing and supports for countertops.
 - 2. Miscellaneous steel components.
- B. Products Furnished, but not installed, under this section include the following:
 - 1. Anchor bolts, steel pipe sleeves, and other items cast into concrete.
- C. Related Sections:
 - 1. Section 01 4500: Quality Control, for independent testing and inspection procedures.
 - 2. Section 03 3000: Cast-In-Place Concrete, for steel items embedded in concrete.
 - 3. Section 09 9000: Painting, for metal finishes.

1.2 SUBMITTALS

- A. Product Data: For grout, paint products, and each manufactured item specified.
- B. Shop Drawings: Show dimensions, fabrication details, installation, anchorage, and templates for anchors and bolts specified for installation under other Sections. Indicate welds by American Welding Society symbols.
- C. Welder certificates certifying that welders comply with requirements specified in "Quality Assurance" Article.

1.3 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1 "Structural Welding Code--Steel."
- B. Welder Qualifications:
 - 1. Use welders certified by AWS and State in which project is located, for structural welding, and who have undergone recertification in the last 12 months.
- C. Comply with requirements/recommendations of American Institute of Steel Construction Specifications for design, fabrication and erection of structural steel for buildings and AISC manual of steel construction.

1.4 REGULATORY REQUIREMENTS

- A. Special inspection is required by State Building Code for structural welding and drilled epoxy anchor bolts of this Section; Refer to Section 01 4500.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to job site with markings corresponding to markings shown on approved Shop Drawings.
- B. Store off ground, under cover and protected from damage.

1.6 FIELD MEASUREMENTS

- A. Verify actual location of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabrication without field measurements, and coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.

1.7 COORDINATION

- A. Coordinate installation of anchorage for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorage, including sleeves, concrete inserts, and anchor bolts, that are to be embedded in concrete or masonry.
 - 1. Deliver such items to Project site in time for installation.

PART 2 PRODUCTS

2.1 MATERIALS - GENERAL

- A. Metal Surfaces: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without pitting, seam marks, mill markings, or blemishes.

2.2 FERROUS METALS

- A. Steel plates, shapes and bars: ASTM A 36.
- B. Steel Tubing, ASTM A 500, cold-formed; Seamless where exposed.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners complying with ASTM B 633, Class Fe/Zn 5a, at exterior walls.
 - 1. Provide stainless steel fasteners for fastening aluminum.
 - 2. Select fasteners of type, grade, and class suited for use intended.
- B. Steel Bolts and Nuts: Regular hexagon-head, ASTM A 307, Grade A; with hex nuts; and, where indicated, flat washers.
- C. Stainless Steel Bolts and Nuts: Regular hexagon-head, annealed stainless steel bolts, nuts and, where indicated, flat washers; ASTM F 593 for bolts and ASTM F 594 for nuts. Alloy Group 1 (A1).
- D. Anchor Bolts: ASTM F 1554, Grade 36.
 - 1. Provide zinc-coated anchor bolts where item being fastened is galvanized.
- E. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488.
 - 1. Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5a.

2. Anchors in Exterior Locations: Alloy Group 1 (A1). Stainless steel complying with ASTM F 593 for bolts and ASTM F 594 for nuts.

F. Cast-In-Place Anchors in Concrete: Anchors capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488.

1. Threaded or wedge type; galvanized either ASTM A 47 malleable iron or ASTM A 27 cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153.

G. Lag Bolts: ASME B18.2.1.

H. Machine Screws: ASME B18.6.3.

I. Wood Screws: Flat head, ASME B18.6.1.

J. Plain Washers: Round, ASME B18.22.1.

K. Lock Washers: Helical spring type, ASME B18.21.1.

2.4 GROUT

A. Nonshrink, Nonmetallic Grout: ASTM C 1107, factory packaged, non-staining, noncorrosive, nongaseous grout, complying with ASTM C 1107.

1. Subject to compliance with requirements provide one of the following:

- a. Burke: Nonmetallic Grout.
- b. Euclid Chemical Co.: NS Grout.
- c. Master Builders: Masterflow 713 or 928.
- d. W.R. Meadows: Sealtight 588 Precision Grout.
- e. Five Star Products, Inc.: Five Star Grout.

2.5 WELDING

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.6 PRIMER

A. Shop Primer for Ferrous Metal: Provide primers specified in Section 09 9000.

B. Galvanizing Repair Paint: High-zinc-dust content paint for regalvanizing welds in steel, complying with SSPC-Paint-20.

C. Bituminous Paint: Cold applied asphalt emulsion complying with ASTM D 1187.

2.7 FABRICATION

A. Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Use connections that maintain structural value of jointed pieces.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work true to line and level with accurate angles and surfaces and straight edges.
- E. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible.
 - 1. Use Phillips flat-headed countersink heads for exposed connections, unless otherwise indicated.
 - 2. Located joints where least conspicuous.
 - 3. Cut abutting members to fit with full bearing contact.
 - 4. Form elbows and bends to uniform radii, free from buckles and twists, and with finished surfaces smooth.
 - 5. Where exposed to weather, fabricate seams and other connections to exclude water. Provide weep holes where water may accumulate.
 - 6. Do not flame cut holes or enlarge holes by burning.
- F. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Provide 3/16 inch minimum fillet welds, unless otherwise indicated.
 - 3. Provide full penetration butt welds.
 - 4. Grind exposed welds smooth and flush.
- G. Miscellaneous Framing and Supports: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
 - 1. Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated.
 - 2. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports.
 - 3. Cut, drill, and tap units to receive hardware, hangers, and similar items.

2.8 ALLOWABLE FABRICATION TOLERANCES

- A. Maximum variation from dimensions shown:
 - 1. Overall length with both ends finished: 1/32 inch.
 - 2. Overall length of member without finished ends:
 - a. For members up to 30 ft. long: 1/16 inch
 - b. For members over 30 ft. long: 1/8 inch

- B. Twists, bends, and kinks are not allowed.

2.9 FINISHES

- A. General: Finish metal fabrications after assembly.
- B. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 123 for steel and iron products, and ASTM A 153 for steel and iron hardware.

- C. Shop prime uncoated steel surfaces, except the following:
 - 1. Surfaces embedded in concrete.
 - 2. Within 2 inches of surfaces to be field welded.
 - 3. Stainless steel.
- D. Preparation for Shop Priming: Prepare uncoated steel surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
 - 1. Exteriors: SSPC-SP-6 "Commercial Blast Cleaning."
 - 2. Interior: SSPC-SP-3, "Power Tool Cleaning."
- E. Shop Priming: Apply one coat primer with a uniform dry film thickness of minimum 2.0 mils.
 - 1. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

2.10 SOURCE QUALITY CONTROL

- A. Owner will engage an independent testing and inspecting agency to provide State Building Code required tests and inspections.
 - 1. Comply with requirements of Section 01 4500, Quality Control.
- B. Shop-welded connections will be visually inspected, and tested according to AWS D1.1. Inspection procedures.
- C. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.
- D. Additional testing will be performed at Contractor's expense to determine compliance of corrected Work with specified requirements.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces plumb, level, true, and free from rack; and measured from established lines and levels.
 - 1. Fit exposed connections accurately together to form hairline joints.
- B. Field weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
- C. Field Welding of Exposed Connections: Finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- E. Do not flame cut holes or enlarge drilled or punched holes with a burning torch.

- F. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction.
 - 1. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.
 - 2. Provide standard plate washers under bolt heads and nuts.
 - 3. Do not thread bolts at shear plane.

3.2 INSTALLATION

- A. Miscellaneous Framing and Supports:
 - 1. Install framing and supports to comply with requirements of items being supported, including manufacturers' instructions and requirements indicated in Shop Drawings.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. Tighten anchor bolts after bearing members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of bearing plate before packing with grout.
 - 1. Pack nonshrink, nonmetallic grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.3 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA-1 for touching up shop-painted surfaces.
 - 1. Apply to provide a minimum 2.0 mil dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes custom fabricated steel railings.
- B. Related Sections.
 - 1. Section 06 1000: Rough Carpentry, for concealed blocking and supports for handrails at wood stud partitions.
 - 2. Section 09 9000: Painting, for metal finishes.

1.2 PERFORMANCE REQUIREMENTS

- A. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of materials based on the following:
 - 1. Steel: 72 percent of minimum yield strength.
- B. Structural Performance of Railings: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails:
 - a. Uniform load of 50 lbf/ ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Top Rail of Guards:
 - a. Uniform load of 50 lbf/ ft. applied horizontally and concurrently with 100 lbf/ft. applied vertically downward.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 3. Infill of Guards:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
 - b. Uniform load of 25 lbf/ sq. ft. applied horizontally.
 - c. Infill load and other loads need not be assumed to act concurrently.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.3 SUBMITTALS

- A. Shop Drawings: Show fabrication and installation of railings. Include plans, elevations, sections, details, and attachments to other work.
 - 1. For installed railings indicated to comply with design loads, include structural analysis data signed and sealed by the Engineer responsible for their preparation who is registered in State in which Project is located.
- B. Indicate welded connections using standard AWS welding symbols. Indicate net weld lengths. Indicate vent holes.

- C. Submit welder certificates for welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm experienced in producing railings similar to those indicated for this Project.
 - 1. Design and fabrication is responsibility of fabricator to meet all building codes applicable to Work of this Section.
- B. NAAMM Railing Standard: Comply with NAAMM AMP 521, "Pipe Railing Systems Manual," for handrails and railings, unless more stringent requirements are indicated.
- C. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1, "Structural Welding Code—Steel."
- D. Regulatory Requirements: Comply with requirements of Chapter 11 of the State of Oregon Structural Specialties Code for railings for stairs required to be accessible for the physically disabled.

1.5 STORAGE

- A. Store railings in a dry, well-ventilated, weathertight place.

1.6 FIELD MEASUREMENTS

- A. Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicated measurements on Shop Drawings.
 - 1. Where field measurements cannot be made without delaying the work, establish dimensions and proceed with fabricating railings without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.

1.7 COORDINATION AND SCHEDULING

- A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry.
- B. Schedule installation so wall attachments are made only to completed walls. Do not support temporarily by any means that do not satisfy structural performance requirements.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.
- C. Steel Tubing: ASTM A 500 (cold-formed), or ASTM A 513, Type 5 (mandrel drawn).

- D. Steel Pipe: ASTM A 53, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
- E. Steel Bars: Hot-rolled, carbon steel complying with ASTM A 29, Grade 1010.
- F. Steel Plates, Shapes, and Bars: ASTM A 36.
- G. Castings: Either gray or malleable iron, unless otherwise indicated.
 - 1. Gray Iron: ASTM A 48, Class 30.
 - 2. Malleable Iron: ASTM A 47.

2.2 FASTENERS

- A. General: Provide concealed plated steel fasteners of electrodeposited zinc coating fasteners complying with ASTM B 633, Class Fe/Zn 25, unless concealed fasteners are unavoidable, or otherwise approved.
 - 1. Provide Type 304 stainless steel Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated.

2.3 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Shop Primers: Provide primers specified in Section 09 9000, Painting.
- C. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in steel, complying with SSPC Paint-20.
- D. Bituminous Paint: Cold applied asphalt emulsion complying with ASTM D 1187.
- E. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- F. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
 - 1. Water-Resistant Product: At exterior locations and where indicated provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating that is recommended by manufacturer for exterior use.

2.4 FABRICATION

- A. Fabricate railings to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including thickness of tube, post spacings, and anchorage where indicated, but not less than needed to withstand design loads.

- B. Fabricate railings with welded connections. Cope components at connections to provide close fit. Weld all around at connections, including fittings.
 - 1. Comply with requirements for Type 2 Railing System Joint Construction in NAAMM AMP 521, "Pipe Railing Systems Manual" for welded railings.
- C. Steel Pipe Handrail: 1-inch standard pipe diameter, size not less than 1-1/4 inch or more than 1-1/2 inch OD.
- D. Form changes in direction of railings by bending. Form simple and compound curves by bending members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- E. Close exposed ends of railing members with prefabricated end fittings.
- F. Provide wall returns at ends of wall mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between rail and wall is 1/4 inch or less.
- G. Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnect railing members to other work.
- H. Provide inserts and other anchorage devices for connecting railings to concrete work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- I. For railing posts set in concrete, provide steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with steel plate forming bottom closure.

2.5 FINISHES

- A Galvanized Railings:
 - 1. Hot-dip galvanize exterior steel and iron railings, including hardware, after fabrication to comply with ASTM A 123.
 - 2. Comply with ASTM A 123 for hot-dip galvanized railings.
 - 3. Comply with ASTM A 153 for hot-dip galvanized hardware.
- B. Fill vent and drain holes that will be exposed in finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
- C. For galvanized railings, provide galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.
- D. Preparation for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic-phosphate process.
- E. Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface-preparation specifications and environmental exposure conditions of installed railings:
 - 1. Exteriors (SSPC Zone 1B): SSPC-SP 6, "Commercial Blast Cleaning."

- F. Apply shop primer to prepared surfaces of railings, unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
 - 1. Do not apply primer to galvanized surfaces.
 - 2. Stripe paint edges, corners, crevices, bolts, and welds.
- G. Paint Finish: As specified in Section 09 9000.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings in location, alignment, and elevation, measured from established lines and levels and free from rack.
 - 1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 - 3. Align rails so variations from level for horizontal members and from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- C. Adjust railings before anchoring to ensure alignment at abutting joints.
- D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.2 RAILING CONNECTIONS

- A. Welded Connections:
 - 1. Use fully welded joints for permanently connecting railing components.
 - 2. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in shop or in field.
- B. Nonwelded Connections:
 - 1. Use mechanical or adhesive joints for permanently connecting railing components.
 - 2. Use wood blocks and padding to prevent damage to railing members and fittings.
 - 3. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.

3.3 ANCHORING POSTS

- A. Anchor posts to concrete substrates by one of the following methods, filling annular space between post and sleeve, or post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions:
 - 1. Use steel pipe sleeves preset and anchored into concrete for installing posts.
 - 2. Form or core-drill holes not less than 5 inches deep and 3/4 inch greater than OD of post for installing posts in concrete. Clean holes of loose material before inserting posts.

- B. Cover anchorage joint with a flange of same metal as post, attached to post by one of the following methods:
 - 1. Weld to post after placing anchoring material.
 - 2. By set screws.
- C. Anchor posts to floor type as required by conditions, bolted to supporting members.
 - 1. Use fittings designed and engineered for this purpose.
- D. Anchor rail ends to wall substrate as required sleeves or flanges connected to rail ends and anchored to supporting structure.
- E. Attach handrails to wall with wall brackets.
 - 1. Provide bracket with 1-1/2 inch clearance from inside face of handrail and finished wall surface.
 - 2. Locate brackets as indicated, or at spacing required to support structural loads if not indicated.
 - 3. For wood stud walls, use hanger or lag bolts set into wood backing between studs. Coordinate with carpentry work to locate backing members.

3.4 CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.5 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work.
 - 1. Return items that cannot be refinished in field to shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes, but not limited to, the following:

1. Framing with dimension lumber and timber.
2. Sheathing.
3. Wood blocking, cants, and nailers.
4. Nails, bolts, screws, framing anchors and other rough hardware required to perform rough carpentry.

B. Related Sections:

1. Section 06 1733: Wood I-Joists.
2. Section 06 2000: Finish Carpentry, for blocking and nailer requirements for exterior exposed wood.
3. Section 06 4000: Architectural Woodwork, for wood blocking support requirements for wall supported casework.
4. Section 07 5100: Built-Up Bituminous Roofing, for requirements for blocking, cants, and nailers.
5. Section 07 6000: Flashing and Sheet Metal, for flexible membrane flashing installed at framed openings.
6. Structural Drawings: Structural Notes related to wood framing.

1.2 DEFINITIONS

A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

B. Timber: Lumber of 5 inches nominal or greater in least dimension.

C. Lumber grading, inspection, and treatment agencies, and the abbreviations used to reference them, include the following:

1. ALSC: American Lumber Standard Committee, Incorporated.
2. APA: American Plywood Association.
3. AWPB: The American Wood-Preservers' Association.
4. NLGA: National Lumber Grades Authority.
5. WCLIB: West Coast Lumber Inspection Bureau.
6. WWPA: Western Wood Products Association.

1.3 SUBMITTALS

A. Product Data for the following:

1. Sheathing.

B. Material certificates for dimension lumber specified to comply with minimum allowable unit stresses.

1. Indicate species and grade for each use and design values approved by the ALSC Board of Review.

C. Wood data for wood preservative treatment from chemical treatment manufacturer.

1. Include certification by treating plant that materials comply with requirements.
2. Indicate type of preservative used and net amount of preservative retained.

3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

D. Research or evaluation reports acceptable to authorities having jurisdiction indicating compliance with State Building Code for the following:

1. Metal framing anchors.
2. Power-driven fasteners.
3. Power-actuated fasteners.
4. Engineered wood products.
5. Wood preservative treated wood.

1.4 QUALITY ASSURANCE

A. Use skilled workers, trained and experienced in necessary crafts, familiar with specified requirements and methods needed for proper performance of Work of this Section.

B. Codes and standards:

1. In addition to complying with applicable codes and regulations of governmental agencies having jurisdiction, unless otherwise specifically directed or permitted by Architect, comply with the following:
 - a. WWPA Product Use Manual, for selection and use of products.
 - b. American Forest & Paper Association, National Design Specifications for Wood Construction, for conformance with structural lumber and fastenings.
 - c. United States Product Standards, Standard for Construction and industrial Plywood, PS1 ANSI A199.1.
 - d. APA Plywood Design Specification APA Y510.

1.5 REGULATORY REQUIREMENTS

A. Comply with State of Oregon Structural Specialty Code, based on IBC, Chapter 23.

B. Special inspections are required as stated in State of Oregon Structural Specialty Code, based on IBC Section 106 and Chapter 17.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protection:

1. Stack lumber flat, shored up off ground surface on blocks or raised platform.
2. Cover wood and protect from weather exposure.
3. Space between each bundle to provide air circulation.
4. Examine wood sheathing upon delivery and reject panels that are delivered with broken corners or edges crushed by bundling straps.
5. Identify framing lumber as to grades, and store each grade separately from other grades.
6. Do not overload, in place, floor or roof framing with temporarily stored materials.

1.7 COORDINATION

A. Coordinate as required with other trades to assure proper and adequate provision in work of those trades to interface with work of this Section.

PART 2 PRODUCTS

2.1 WOOD PRODUCTS

- A. Lumber Standard: Comply with American Softwood Lumber Standard, DOC PS 20.
 - 1. Dressing Requirements: Smooth four sides, S4S, unless otherwise indicated.
 - 2. Dimension Lumber Maximum Moisture Content: 19 percent at time of dressing.
- B. Wood Structural Panels: Provide APA performance rated panels complying with grade, span rating, and exposure durability classification indicated, and the following:
 - 1. Plywood: DOC PS 1.
 - 2. Factory mark panels according to indicated standard.
- C. Engineered Wood Products:
 - 1. Provide engineered wood products that are acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
 - 2. Allowable Stress Design: Provide engineered wood products with allowable design stresses, as published by manufacturer, which meet or exceed those indicated.

2.2 GRADE AND TREATMENT STAMPS

- A. Identify each piece of framing lumber by grade stamp of WCLIB or WWPA.
- B. Identify each wood sheathing panel as to species, grade, and glue type with APA stamp.
- C. Stamp each preservative treated wood piece with AWPB treatment stamp or furnish certificate of inspection with each shipment.
 - 1. For exposed lumber to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificate of treatment compliance.

2.3 PRESERVATIVE TREATED MATERIALS

- A. General: Provide lumber and plywood complying with applicable requirements of AWPA, as follows:
 - 1. Lumber: AWPA C2.
 - 2. Plywood: AWPA C9.
- B. Do not use chemicals containing arsenic or chromium.
- C. For exposed wood to receive stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, contain colorants, or adversely affect finishes.
- D. Kiln dry after treatment to a maximum moisture content of 19 percent for wood, and 15 percent for plywood.
- E. Treat the following wood items:
 - 1. Cants, nailers, blocking, curbs, equipment support bases, stripping and similar items in associated with roofing, flashing and waterproofing.
 - 2. Floor plates, sills, blocking, furring, stripping and similar items in contact with concrete.

3. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
4. Decking lumber.

F. Where possible, precut material before treatment. Apply field treatment complying with AWWPA M4 to cut surfaces.

G. Products:

1. Nisus Corporation: BORA-CARE Wood Preservative.
2. Chemical Specialties, Inc., ACQ Preserve Plus.
3. Substitutions: Submit in accordance with requirements of Section 01 2500.

2.4 WOOD MATERIALS

A. Concealed Dimension Lumber: Provide species of grades indicated:

- | | | | |
|----|--|--|-------------------|
| 1. | Studs and Plates, Non-Load Bearing: | Douglas Fir
Stud Grade | NLGA, WWPA, WCLIB |
| 2. | Studs and Plates, Load Bearing: | Douglas Fir
No. 2 & BTR | NLGA, WWPA, WCLIB |
| 3. | Joists, Rafters and Other Framing: | Douglas Fir
No. 2 | NLGA, WWPA, WCLIB |
| 4. | Beams, Stringers and Posts: | Douglas Fir
No. 1 | NLGA, WWPA, WCLIB |
| 5. | Bucks, Blocking, Bridging,
Stripping and Miscellaneous: | Douglas Fir
No. 2 | NLGA, WWPA, WCLIB |
| 6. | Sills, Sleepers, Plates, Nailing
Blocks and Other Wood in Contact
with Concrete: | Pressure Treated
Douglas Fir
No. 2 | NLGA, WWPA, WCLIB |
| 7. | Concealed Boards for Furring. | Common No. 3
Standard | WWPA
WCLIB |
| 8. | Concealed Decking | Douglas Fir
Commercial Dex | |

B. Concealed Timber Framing: Provide species of grades indicated:

- | | | | |
|----|-----------------------------|----------------------|-------------------|
| 1. | Beams, Stringers and Posts: | Douglas Fir
No. 1 | NLGA, WWPA, WCLIB |
|----|-----------------------------|----------------------|-------------------|

C. Concealed Engineered Wood Lumber:

1. Laminated Veneer Lumber (LVL): Structural composite of wood veneers with grain primarily parallel to member lengths, manufactured with exterior-type adhesive complying with ASTM D 2559 and containing no urea formaldehyde, evaluated and monitored according to ASTM D 5456.

2. Parallel Strand Lumber (PSL): Structural composite of wood strand elements with grain primarily parallel to member lengths, manufactured with exterior-type adhesive complying with ASTM D 2559 and containing no urea formaldehyde, evaluated and monitored according to ASTM D 5456.
3. Acceptable Manufacturers: Subject to compliance with requirements, provide products from the following, or approved:
 - a. Trus Joist, a Weyerhaeuser business.
- D. Exposed Framing Lumber: Provide species and of grades indicated according to the ALSC National Grading Rule provisions of the inspection agency listed.
 1. Douglas Fir, Select Structural; WWPA.
 2. Redwood, Clear Structural; RIS.
- E. Structural Use Panels; Comply with the following unless otherwise indicated:
 1. Wall Sheathing: C-D plywood, square edges, Span Rating 32/16, Exterior, Structural I; 1/2 inch thickness.
 2. Roof Sheathing: C-D plywood, square edges, Span Rating 40/20, Exterior, Structural I; 5/8 inch thickness.
 - a. Exposed Roof Sheathing at Open Eaves: APA Appearance Grade Exterior, B-C, Span Rating not less than 32/16; 5/8 inch thickness.

2.8 FASTENERS

- A. General:
 1. Provide fasteners of size and type indicated that comply with requirements specified for material and manufacture
 2. Where in contact with preservative treated wood, provide fasteners as follows:
 - a. Interior Locations: Hot-dip, zinc coated complying with ASTM A 153.
 - b. Exterior Locations and where stainless steel framing anchors are used: Type 304 stainless steel.
- B. Roof and Wall Sheathing: Hot-dip zinc coated complying with ASTM A 153 or Type 304 stainless steel.
 1. Screws for "Dry-Wall" Type, Non-Load Bearing Steel Framing: Comply with ASTM C 1002 for steel framing less than 0.033 inch thick.
- C. Screws for fastening: Steel drill screws, in type and length recommended by screw manufacturer for material being fastened, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117. Provide washers or plates if recommended by sheathing manufacturer.
- C. Nails, Brads, and Staples: ASTM F 1667.
- D. Wood Screws: ASME B18.6.1.
- E. Bolts: Steel bolts complying with ASTM A 307, Grade A, with ASTM A 563 hex nuts and where indicated, flat washers.
- F. Power Driven Fasteners: NES NER-272.

- G. Powder Activated Drive Pins: Hilti or Ramset.
- H. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488.
 - 1. Interior Locations: Carbon steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Exterior Locations: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.
 - 3. Attachment to Concrete: Kwik-Bolt or sleeve Anchor by Hilti, Red Head Wedge Anchor by Phillips, Trubolt or Dynabolt by Ramset, Paraboit by U.S.M.
 - 4. Attachment to Masonry: Sleeve Anchor by Hilti, Red head. Sleeve anchor by Phillips.

2.9 METAL FRAMING ANCHORS

- A. Basis of Design Products: Subject to compliance with requirements, provide products by Simpson Strong-Tie Company, Inc.
 - 1. Substitutions: Submit according to requirements of Section 01 2500.
- B. Interior Locations; Galvanized Steel Sheet: Hot-dip, zinc coated steel sheet complying with ASTM A 653 coating designation.
 - 1. Where in contact with preservative treated wood: Provide G185 coating.
- C. Exterior Locations; Stainless Steel: ASTM A 666, Type 304. Type 316.

2.10 MISCELLANEOUS MATERIALS

- A. Construction Adhesive/Glue: Per Industry Standard APA AFG-01.
 - 1. Adhesive for Gluing to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
- B. Sill-Sealer Gaskets: Glass-fiber resilient insulation 1 inch nominal thickness, compressible to 1/32 inch, width to suit width of sill members.
 - 1. Damp Locations: Closed-cell neoprene foam, 1/4 inch, width to suit width of sill members.
- C. Water Repellant Preservative: NWWDA tested and accepted formulation containing 3-into-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set rough carpentry to required level and lines, with members plumb, true to line, cut, and fitted.
 - 1. Produce joints that are tight, true, and well nailed.
 - 2. Do not shim framing components.
- B. Provide and locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

- C. Framing Standard:
 - 1. Comply with American Forest & Paper Association's (AF&PA) "Details for Conventional Wood Frame Construction," unless otherwise indicated.
 - 2. Install engineered wood products to comply with manufacturer's written instructions.
- D. Metal Framing Anchors: Install to comply with manufacturer's written instructions.
 - 1. Provide metal post caps and bases at posts and columns.
- E. Do not splice structural framing members between supports.
- F. Provide minimum 2 inch nominal thick blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, trim, toilet accessories, cabinets, toilet compartments, plumbing, fire protection, mechanical, electrical equipment, and the like.
- G. Block edges of discontinuous sheathing, and edges of sheathing where such blocking is shown in Drawings. Install nominal 2 by 4 nominal size or thicker blocking at unsupported joints in wall sheathing.
- H. Provide fire blocking in stud spaces, furred spaces, and other concealed cavities as indicated using fitted solid wood blocks of same width as framing members and 2 inch nominal thickness and as follows:
 - 1. Fire block concealed spaces of walls and partitions at each floor level, at ceiling line of top story, at not more than 96 inches o.c.
 - 2. Fire block furred spaces of walls, at each floor level, at ceiling, not more than 96 inches o.c.
- I. Selection of Lumber Pieces:
 - 1. Select individual pieces so that knots and obvious defects do not interfere with placing bolts or nails for proper connections.
 - 2. Cut out and discard pieces with defects that render a piece unable to serve its intended function.
 - 3. Lumber may be rejected by Architect, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.
 - 4. Hand select exposed framing members for appearance and function.
- J. Provide field treatment complying with AWPA M4 to cut surfaces of preservative treated lumber and plywood.
- K. Securely attach rough carpentry to substrates by anchoring and fastening as indicated, complying with the following:
 - 1. Oregon Structural Specialty Code, IBC Table 2304.9.1, "Fastening Schedule."
 - 2. NES NER-272 for power-driven fasteners.
- L. Hang mechanical equipment, mechanical and sprinkler piping larger than 2 inch diameter, or other items producing hanger load over 50 lbs. by a system approved by Architect.
 - 1. Provide additional framing for any hanger producing a load over 200 lbs. to transfer loads to main structural beams or walls.

M. Wood Furring: Install level and plumb with closure strips at edges and openings, and at each floor and ceiling surface. Shim as required for tolerance of finished work.

1. Furring to Receive Gypsum Board: Install 1 by 2 nominal size at 16 inches o.c.
2. Furring to Receive Plywood: Install 1 by 3 nominal size at 24 inches o.c.

N. Temporary Support: Adequately brace structure for wind and earthquake forces until floor, roof and wall have been secured.

3.2 WALL AND PARTITION FRAMING INSTALLATION

A. General: Provide single bottom plate and double top plates, except single top plate may be used for non-load bearing partitions.

1. Walls: Install 2 by 4 nominal studs at maximum 16 inches on center, unless otherwise indicated.
 - a. Provide minimum nominal 2 by 6 studs for wall studs over 12 feet of unsupported length.
2. Provide continuous horizontal blocking at midheight of partitions more than 8 feet high using members of 2 inch nominal thickness of same width as wall.

B. Construct corners and intersections with 3 or more studs except that 2 studs may be used for interior non-load bearing partitions.

C. Frame openings with multiple studs and headers of member thickness equal to width of studs. Support headers on jamb studs.

1. For non-load bearing partitions, provide double jamb studs and headers not less than the following for indicated opening width:
 - a. Openings 4 feet and less: 4 inch nominal depth header.
 - b. Openings 4 to 6 feet: 6 inch nominal depth header.
 - c. Openings 6 to 10 feet: 8 inch nominal depth header.
 - d. Openings 10 to 12 feet: 10 inch nominal depth header.
2. For load bearing walls, provide double jamb studs for openings 5 feet and less in width, and triple jamb studs for wider openings. Provide headers of depth indicated.

3.3 CEILING JOIST AND RAFTER FRAMING INSTALLATION

A. Ceiling Joists: Install with crown edge up and complying with requirements specified for floor joists. Face nail to ends of parallel rafters.

1. Where ceiling joists are at right angles to rafters, provide additional short joists parallel to rafters from wall plate to first joist; nail to ends of rafters and to top plate and nail to first joist or anchor with framing anchors or metal straps. Provide 1 by 8 inch nominal size or 2 by 4 nominal size stringers spaced 48 inches o.c. crosswise over main ceiling joists.

- B. Rafters: Notch to fit exterior wall plates and use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.
 - 1. At valleys, provide double valley rafters of size indicated, or if not indicated, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against valley rafters.
 - 2. At hips, provide hip rafter of size indicated, or if not indicated, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against hip rafter.
- C. Provide collar beams (ties) as indicated, or if not indicated, provide 1 by 6 nominal size boards between every third pair of rafters, but not more than 48 inches o.c. Located below ridge member, at third point of rafter span. Cut ends to fit roof slope and nail to rafters.
- D. Provide special framing as indicated for eaves, overhangs, dormers, and similar conditions, if any.

3.4 SHEATHING INSTALLATION

- A. Verify blocking is in place and located properly prior to installation of sheathing.
- B. Placement of Wood Sheathing:
 - 1. Place wood sheathing panels with face grain perpendicular to supports at roof and vertically at walls, continuously over at least two supports, except where otherwise indicated. Stagger end joints 4 feet at adjacent panels.
 - 2. Adjust layout to eliminate sheathing pieces less than one foot wide.
 - 3. Center joints over supports. Space panels 1/8 inch apart at edges and ends using spacer tool, including at tongue and groove joints.
 - 4. Nail to wood framing.
 - 5. For wall and roof sheathing, back panel edges with minimum 2 by 4 blocking.
 - a. Where underside of roof sheathing is exposed at eaves, place with Appearance Grade B veneer grade face down.
 - 6. Fastening Wood Sheathing for Walls:
 - a. Use minimum 8d common nail size for nailing wood sheathing.
 - b. Space nails at minimum of 6 inches o.c. at panel edges, and 12 inches o.c. in panel field.
 - c. Refer to Drawings for special nailing requirements.
 - 7. Fastening Wood Sheathing for Roofs:
 - a. Use minimum 8d common nail size for nailing 5/8 inch thick wood sheathing; use minimum 10d common nail size for nailing 3/4 inch thick wood sheathing.
 - 1) Use ring shank nails for nailing sheathing at roof corners.
 - 2) Use fastener length that minimum 1/8 inch of fastener penetrates beyond bottom of wood sheathing panel.
 - b. Space nails at minimum of 6 inches on center at panel edges, and in panel field.
 - c. Refer to Drawings for special nailing requirements.

3.5 CANT STRIPS

- A. Provide pressure treated cant strips at perimeter of built-up roofing where roof intersects vertical surfaces, and as shown or required by roofing manufacturer. Shim as required to make level.

3.6 CORRECTION OF DEFECTIVE WORK

- A. Remove split and warped framing prior to installation of finish materials.
- B. Adjust framing to comply with location and deflection requirements of National Design Specifications for Wood Construction.
- C. Remove and replace sheathing panels with edges split or damaged by fasteners.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Prefabricated wood web I-joists for floor framing.
2. Bridging, bracing and anchorage.

B. Related Sections:

1. Section 01 4115: Design-Build Requirements
2. Section 06 1000: Rough Carpentry, for floor sheathing, engineered wood products, and wood bracing material.
3. Structural Drawings: Notes

1.2 DEFINITIONS

A. Lumber grading and inspection agencies and the abbreviations used to reference them, include the following:

1. APA: American Plywood Association.
2. WCLIB: West Coast Lumber Inspection Bureau.
3. WWPA: Western Wood Products Association.

1.3 SUBMITTALS

A. Product Data: Provide joist configurations, bearing and anchor details, and bridging and bracing.

B. Shop Drawings: Indicate sizes and spacing of joists, loads and joist cambers, and framed openings, signed and sealed by a professional engineer licensed in the State where Project is located.

1. Submit design calculations, signed and sealed by a professional engineer licensed in the State where Project is located.

C. Manufacturer's certification that joists have been installed in accordance with manufacturer's design and installation requirements.

1.4 QUALITY ASSURANCE

A. Manufacturer/Fabricator: Company specializing in the manufacture of the products specified in this Section with minimum three years documented experience; fabricating plant approved by ICBO certified testing agency.

B. Design joists and associated components under direct supervision of a professional engineer experienced in design of this work and licensed in the State where Project is located.

C. Joist manufacturer to inspect all "I" joists after they have been erected including sheathing, bridging, and blocking associated with joists. Manufacturer to submit certificate to Architect that the inspection was made and that the joists are in acceptable condition and meet with the manufacturer's design and installation requirements.

1.5 REGULATORY REQUIREMENTS

A. Conform to applicable code requirements for loads, seismic, and other governing criteria.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle products to site under applicable provisions of Section 01 6000, Rough Carpentry.
- B. Protect structural components from warping or other distortion by stacking in vertical position, braced to resist movement.

1.7 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated in Drawings and Shop Drawings.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements provide products of the following, or approved:

- 1. Trus Joist (TJI).

2.2 FABRICATED UNITS

- A. Wood I-Joists: Prefabricated units, I-shaped in cross section, made with solid or structural composite lumber flanges and wood-based structural panel webs, let into and bonded to flanges. Provide units with material requirements complying of and with structural capabilities established and monitored according to ASTM D 5055.

- 1. Provide I-joists manufactured without urea formaldehyde.
- 2. Web: Either of the following:
 - a. Plywood, complying with DOC PS 1, Exterior grade.
 - b. Oriented Strand Board complying with DOC PS 2, Exposure 1.
- 3. Provide units complying with APA PRI-400, factory marked with APA trademark indicating nominal joist depth, joist class, span ratings, mill identification, and compliance with APA standard.

- B. Rim Boards: Performance rated product complying with APA PRR-401.

- 1. Material: All-veneer panels, composite panels, glulams or structural composite lumber.
- 2. Thickness and Grade: As indicated in Structural Drawings.
- 3. Factory mark with APA trademark indicating thickness, grade, and compliance with APA standard.
- 4. Provide performance-rated product complying with APA PRR-401, rim board grade, factory marked with APA trademark indicating thickness, grade, and compliance with APA standard.

- C. Joist Bridging: Type, size and spacing as recommended by joist manufacturer, or as indicated.

2.3 ACCESSORIES

- A. Wood Blocking and Bridging: Materials as specified in Section 06 1000, Rough Carpentry.

2.4 FABRICATION

- A. Wood Chord and Wood Web Joists: Design and manufactured to standards set forth in
NER-200 Report.
- B. Brace members for support during transit.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that supports are ready to receive units.

3.2 PREPARATION

- A. Coordinate placement of support items.

3.3 INSTALLATION

- A. Install engineered wood framing to comply with manufacturer's instructions with all
accessories required for a complete system.
 - 1. Do not cut chord members of wood I-Joists.
- B. Set structural members to required levels and lines, with members plumb.
- C. Install blocking at all bearing points, as indicated, and as required to support facing materials,
fixtures, specialty items, and trim.
- D. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure
plumb, and in true alignment until completion of erection and installation of permanent
bridging and bracing, and sheathing material has been applied. Design and temporary
bracing and shoring is entirely the responsibility of the Contractor.
- E. Coordinate placement of sheathing with work of this Section.

3.4 TOLERANCES

- A. Framing Members: 1/2 inch maximum from true position.

3.5 FIELD QUALITY CONTROL

- A. Joist manufacturer to inspect joists after they have been erected, and sheathing, bridging,
blocking, and the like are in place.
- B. Joist manufacturer to submit certificate to Architect certifying that the inspection was made
and that joists are in acceptable condition and meet the manufacturer's design and installation
requirements.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes:

1. Exterior standing and running trim.
2. Exterior wood stairwork, ramp and loading dock.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Section 06 1000: Rough Carpentry, for exposed framing, and furring, blocking, and other carpentry work not exposed to view.
2. Section 06400: Architectural Woodwork, interior woodwork not specified in this Section.
3. Section 07 4646: Mineral-Fiber Cement Siding, for siding to receive wood trim and wood battens specified in this Section.
4. Section 07 9200: Joint Sealants
5. Section 09 9000: Painting, priming and back priming of finish carpentry.

1.2 SUBMITTALS

A. Product Data: For each type of product, process and factory fabricated product.

1. Include data for wood preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
2. For water-borne-treated products include statement that moisture content of treated materials was reduced to levels indicated before shipment to Project site.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Experienced Installer who has completed finish carpentry similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Storage:

1. Protect materials against weather and contact with damp or wet surfaces.
2. Stack lumber, plywood, and other panels.
3. Provide for air circulation within and around stacks and under temporary coverings.

1.5 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installing exterior finish carpentry only when existing and forecasted weather conditions will permit work to be performed according to manufacturer's recommendations and warranty requirements and at least one coat of specified finish to be applied without exposure to rain, snow, or dampness.

1.6 COORDINATION

A. Coordinate sizes and locations of framing, blocking, reinforcements, and other related items of Work specified in other Sections to ensure that exterior woodwork can be supported and installed as indicated.

PART 2 PRODUCTS

2.1 MATERIALS, GENERAL

- A. Lumber: Comply with DOC PS 20, "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by American Lumber Standards' Committee Board of Review.
- B. Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.
 - 1. For exposed lumber, furnish pieces with grade stamps applied to ends or back of each piece, or omit grade stamps entirely and provide certificates of grade compliance issued by inspection agency.
- C. Inspection Agencies: Inspection agencies, and the abbreviations used to reference them, include the following:
 - 1. WCLIB - West Coast Lumber Inspection Bureau.
 - 2. WWPA - Western Wood Products Association.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: Comply with AWPA C2 (lumber) and AWPA C9 (plywood) except that lumber that is not in contact with ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).
 - 1. Preservative Chemicals: Pressure-impregnate woodwork with preservative chemicals acceptable to authorities having jurisdiction.
 - 2. Do not use chemical formulations that require incising.
 - 3. For exposed items indicated to receive transparent finish, do not use chemical formulations that bleed through or otherwise adversely affect finishes.
 - 4. Kiln-dry material after treatment to levels required for untreated material. Do not use material that is warped or does not comply with requirements for untreated material.
 - 5. Do not use chemicals containing chromium or arsenic.
 - 6. Application: Exterior trim, loading dock, and other exterior wood carpentry work indicated in Drawings.
- B. Acceptable Products:
 - 1. Nisus Corporation: BORA-CARE Wood Preservative.
 - 2. Chemical Specialties, Inc.: ACQ Preserve Plus.
 - 3. Substitutions: Submit in accordance with requirements of Section 01630.

2.3 FABRICATION

- A. Wood Moisture Content: 9 to 15 percent.
- B. Fabricate finish carpentry to dimensions, profiles, and details indicated.

2.4 EXTERIOR STANDING AND RUNNING TRIM

- A. Lumber Trim: Provide finished lumber complying with the following requirements including those of the grading agency listed with species:
1. Species: Western red cedar.
 - a. WCLIB: Cedar Industrial Clears; Grade B and Better.
 - b. WWPA: Grade B.
 2. Lumber for Painted Finish: Glued-up lumber or solid lumber stock.
- B. Back out or groove backs of flat trim members and kerf backs of other wide, flat members, except members with ends exposed in finished work.

2.5 STAIRWORK, RAMP AND LOADING DOCK

- A. Wood Species for Opaque Finish:
1. Species: Western red cedar.
 - a. WCLIB: Cedar Industrial Clears; Grade B and Better.
 - b. WWPA: Grade B.
- B. Finish: Opaque.

2.6 MISCELLANEOUS MATERIALS

- A. Fasteners for Exterior Finish Carpentry: Provide nails of the following materials, in sufficient length to penetrate minimum of 1-1/2 inches into substrate, unless otherwise recommended by manufacturer.
1. Stainless steel.
 2. Hot-dip galvanized steel.
 3. Aluminum.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage.
1. Provide nonferrous metal or hot-dip galvanized anchors and inserts, unless otherwise indicated.
 2. Provide toothed steel or lead expansion sleeves for drilled-in-place anchors.
- C. Flashing: Comply with requirements of Section 07 6000 for flashing materials installed in finish carpentry.
- D. Sealant: Comply with requirements of Section 07 9200 for materials required for sealing exterior woodwork.

2.7 FINISHES

- A. General: Paint as specified in Section 09 9000, Painting, for exterior wood.
- B. Apply one coat of sealer or primer compatible with finish coats to concealed surfaces of exterior finish carpentry. Apply two coats to end-grain surfaces.
1. Apply sealer or primer in shop or in the field.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting installation and performance of finish carpentry.
 - 1. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Before installation, condition finish carpentry to average prevailing humidity conditions in installation areas.
- B. Prime and backprime lumber for painted finish exposed on the exterior. Comply with requirements for surface preparation and application in Section 09 9000, Painting.

3.3 INSTALLATION, GENERAL

- A. Do not use finish carpentry materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.
 - 1. Do not use manufactured units with defective surfaces, sizes, or patterns.
- B. Install finish carpentry plumb, level, true, and aligned with adjacent materials. Use concealed shims where required for alignment.
 - 1. Scribe and cut finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 - 2. Countersink nails, fill surface flush, and sand where face nailing is unavoidable.
 - 3. Install to tolerance of 1/8 inch in 96 inches for plumb and level. Install adjoining finish carpentry with 1/32 inch maximum offset for flush installation and 1/16 inch maximum offset for reveal installation.
 - 4. Coordinate finish carpentry with materials and systems in or adjacent to standing and running trim. Provide cutouts for mechanical and electrical items that penetrate exposed surfaces of finish carpentry components.
 - 5. Provide cutouts for mechanical and electrical items that penetrate exposed surfaces of finish carpentry components.
- C. Preservative Treated Wood: Were cut or drilled in field, treat cut ends and drilled holes according to AWPA M4.
- D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk concealed fasteners and blind nailing. Use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork.
- E. Finish: Finish according to specified requirements.

3.4 STANDING AND RUNNING TRIM INSTALLATION

- A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available.
 - 1. Do not use pieces less than 36 inches long, except where necessary. Scarf running joints and stagger in adjacent and related members.

2. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint.
3. Use scarf joints for end-to-end joints.
4. Plane backs of casings to provide uniform thickness across joints, if required.

B. Fit exterior joints to exclude water. Apply flat grain lumber with bark side exposed to weather.

3.5 STAIRWORK

1. Cut carriage to fit treads and risers and anchor to support framing.
2. Anchor treads and risers to carriages.
3. Support wall railings on metal brackets and secure to wall framing.
4. Install treads and risers not to exceed 1/8 inch from indicated position, and 1/16 inch out of position in respect to adjacent treads and risers.

3.6 ADJUSTING AND CLEANING

- A. Repair damaged or defective finish carpentry where possible to eliminate functional or visual defects. Where not possible to repair, replace finish carpentry. Adjust joinery for uniform appearance.
- B. Clean finish carpentry on exposed and semi-exposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

3.7 PROTECTION

- A. Provide final protection and maintain conditions that ensure finish carpentry is without damage or deterioration at the time of Substantial Completion.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes the following for interior architectural woodwork:

1. Interior standing and running trim.
2. Plastic laminate clad cabinets.
3. Plastic laminate countertops.
4. Solid surfacing material countertops.
5. Shop finishing of woodwork.

B. Related Sections:

1. Section 06 1000: Rough Carpentry, for wood furring, blocking, shims, and hanging strips for installing woodwork and concealed within other construction before woodwork installation.
2. Section 06 2000: Finish Carpentry, for exterior woodwork exposed to view not specified in this Section.
3. Section 07 9200: Joint Sealants
4. Section 08 1400: Wood Doors.
5. Section 09 9000: Painting, for wood finishes.
6. Division 22: Plumbing, for plumbing work incorporated in casework.
7. Division 23: Heating, Ventilating, and Air Conditioning, for HVAC work incorporated in casework.
8. Division 26: Electrical, for electrical work incorporated in casework.

1.2 DEFINITIONS

A. Architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items, unless concealed within other construction before woodwork installation.

B. Cabinet Surfacing:

1. Exposed Surfaces: Surfaces visible when doors and drawers are closed, including visible surfaces in open cabinets or behind glass doors. Bottom of wall cabinets are defined as "exposed."
2. Semi-exposed Surfaces: Surfaces behind opaque doors or drawer fronts, including interior faces of doors and interiors and sides of drawers.
3. Concealed Surfaces: Surfaces not usually visible after installation, including sleepers, web frames, dust panels, bottoms of drawers, and ends of cabinets installed directly against and completely concealed by walls or other cabinets. Tops of wall cabinets and utility cabinets are defined as "concealed."

1.3 SUBMITTALS

A. Product Data: For each type of product and process specified including cabinet hardware and accessories, and installation instructions.

B. Shop Drawings:

1. Show location of each item with dimensioned plans and elevations, indicating materials, component profiles, assembly methods, joint details, fastening methods, accessory listings, hardware location, and schedule of finishes.

2. Show locations and sizes of cutouts and holes for plumbing and electrical work incorporated in woodwork.
3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
4. Show direction grain of wood faced items for transparent finish.

C. Samples:

1. Lumber to receive Transparent Finish: Two 5 by 24 inch long for each species and cut, finished on one side and 1 edge.
2. Plastic Laminate Clad Panel Products: Two 8 by 10 inch size samples for each color, texture and pattern of plastic laminate and melamine material specified.
3. Solid surfacing materials: Two 6 by 6 inch samples.
4. Submit one sample of each hardware item in specified finish.
 - a. Approved samples may be used in the final installation.

1.4 QUALITY ASSURANCE

- A. Quality Standard: Comply with Architectural Woodwork Institute's (AWI) "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.
- B. Fabricator and Installer Qualifications:
 1. Firm experienced in producing casework for projects of similar size, quality and complexity.
 2. Engage a firm qualified to assume single-source responsibility for fabricating, finishing, and installing Work of this Section in accordance with the referenced standard.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect units from moisture damage, and damage by project construction operations.

1.6 ENVIRONMENTAL CONDITIONS

- A. Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Maintain temperature between 60 and 90 degrees F in areas where architectural woodwork is installed.

1.7 FIELD MEASUREMENTS

- A. Locate concealed framing, blocking and reinforcements that support woodwork by field measurements before being enclosed and indicated measurements in Shop Drawings.
- B. Field verify measurements of other construction that woodwork is intended to fit to prior to fabrication of woodwork. Where measurements cannot be made prior to Shop Drawings, provide allowance for trimming at site and coordinate construction to ensure that actual dimensions correspond to established woodwork dimensions shown in Shop Drawings.

1.8 COORDINATION

- A. Coordinate work of this Section with plumbing and electrical rough-in, and other finish work.
- B. Coordinate sizes and locations of framing, furring, blocking, reinforcements, and other related units of work specified in other Sections for supporting and installing architectural woodwork items.

PART 2 PRODUCTS

2.1 MATERIALS - GENERAL

- A. General: Provide materials that comply with requirements of the AWI quality standard for each type of woodwork and grade specified.

2.2 WOOD MATERIALS

- A. Softwood Lumber: DOC PS 20; average moisture content of 6 percent; Douglas Fir or Hemlock species.
- B. Hardwood Lumber: AHA A135.4.
- C. Particleboard: ANSI A208.1, Grade M-2 or Grade M-2 Exterior Glue, 45 pcf density, of grade to suit application; sanded faces;
 - 1. Roseburg Forest Products: Roseburg SkyBlend.
- D. Softwood Plywood: DOC PS 1; core materials Douglas Fir or Hemlock species.
- E. Hardboard: AHA A135.4 Class 1 Tempered; smooth two sides, 1/4 inch thick unless otherwise indicated.
 - 1. Masonite Corporation, or approved.
- F. Medium Density Fiberboard (MDF): ANSI A208.2, Grade MD made with binder containing no urea formaldehyde.
 - 1. Medite II; SierraPine Ltd., Medite Div.
 - 2. Weyerhaeuser; Premier Plus.

2.3 PLASTIC LAMINATES

- A. Plastic Laminate (PLAM): High pressure decorative laminate (HPDL) complying with NEMA LD3, grades as indicated or, if not indicated, as required by woodwork quality standard; manufacturer, color, pattern, and surface texture as scheduled.
- B. Thermoset Decorative Panels: Particleboard complying with ANSI A208.1, Grade M-2, with surface of thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1, color as selected:
 - 1. Provide PVC or polyester edge banding complying with LMA EDG-1 on components with exposed or semiexposed edges.

2. Acceptable Manufacturers:
 - a. RMP; Roseburg Melamine Products.
 - b. KorTron; Willamette Industries.

- C. Backing Sheet: NEMA LD 3, Grade BKL, undecorated plastic laminate.
- D. Adhesive for Bonding Plastic Laminate: Aliphatic resin, Resorcinol, or approved.
- E. Joint Sealant for Plastic Laminate: Clean translucent mildew-resistant silicone by Dow, General Electric, or approved.

2.4 SOLID SURFACING MATERIAL

- A. Solid Surfacing Material (SSM): Homogeneous solid sheets of filled plastic resin complying with ISSFA-2, thickness as indicated.
- B. Surface Burning Characteristics: Not exceeding the following values per ASTM E 84.
 1. Flame Spread: 15.
 2. Smoke Developed: 30.

2.5 ACCESSORIES

- A. Fasteners: Size and type to suit application.
- B. Bolts, Nuts, Washers, Lags, Pins, and Screws: Select type, size and finish to suit application.
- C. Concealed Joint Fasteners: Threaded steel.

2.6 HARDWARE

- A. Drawer Slides: Load capacity of drawers (loaded with paper) is defined as drawer depth by height by width (in inches) by 0.017 lbs. cu/in. plus 30 pounds.
 1. Pencil Drawers: Accuride 2632, Steel ball bearings, full extension, load capacity up to 65 lbs. per pair.
 2. Light to Medium Duty Drawers: Accuride 3832, Steel ball bearings, full extension, load capacity up to 100 lbs. per pair; for drawers that are 16 inches wide or less.
 3. Light to Medium Duty Drawers: Accuride 7432, Steel ball bearings, full extension, load capacity up to 100 lbs. per pair; for drawers 24 inches wide or less.
 4. Medium to Heavy Duty Drawers: Accuride 4034, Steel ball bearings, full extension with 1 inch overtravel, progressive movement, load capacity 150 lbs. per pair; for drawers 24 inches wide or less.
 5. Heavy Duty or Lateral File Drawers: Accuride 3640, Steel ball bearings, full extension with 1 inch overtravel, progressive movement, load capacity up to 200 lbs. per pair; for drawers 42 inches wide or less.
- B. Cabinet Shelf Supports, Adjustable: Knappe & Vogt No. 346 for drilled holes; Nickel-plated finish.

- C. Wall Shelf Supports, Adjustable: Knapé & Vogt Heavy duty No. 87 standards with No. 187 brackets; Anochrome finish.
- D. Cabinet Hinges:
 - 1. Concealed Hinge (European Type): Self closing, minimum 165 degree opening, nickel-plated. Provide minimum 3 hinges for doors over 48 inches high.
 - a. Grass America, Inc.: No. 3903.
 - b. Blum: Clip Modul 170 Series.
 - c. Håfele: Duomatic 165.
- E. Cabinet Catches: Heavy-duty magnetic catch, Epco 1000LS, or approved.
 - 1. Standard Cabinet Doors: Provide one per door.
 - 2. Closet Doors: Provide two per leaf.
- F. Drawer and Door Locks: 5-pin tumbler, dead bolt with metal strike:
 - 1. Doors: National N8123-26D.
 - 2. Drawers: National N8149-26D, or Corbin No. CB738.
- G. Drawer and Door Pulls: Doug Mockett, Arc Pull DP54D.
- H. Silencers: Clear oft vinyl round bumpers, 2 per door.
- I. Grommets: 2 inch OD molded plastic with hole and cap with slot for cable passage; color as selected from standard range.
- J. Substitutions: Submit according to requirements of Section 01 2500.

2.7 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size and finish required for each substrate for secure anchorage.
 - 1. Provide nonferrous metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance.
 - 2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

2.8 FABRICATION, GENERAL

- A. Interior Woodwork Grade: Unless otherwise indicated, provide Custom Grade woodwork complying with requirements of referenced AWI Quality Standard.
- B. AWI Type of Cabinet Construction: Flush overlay, unless otherwise indicated.
- C. Complete fabrication, including assembly, finishing, and hardware application in shop to greatest extent possible before delivery to Project site.
 - 1. Disassemble only as necessary for shipment and installation.

- D. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting. Provide trim for scribing and site cutting.
- E. Shop cut and locate openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items, using templates or roughing-in diagrams.
 - 1. Seal edges of openings in countertops with a water-resisting coating.

2.9 STANDING AND RUNNING TRIM FOR TRANSPARENT FINISH

- A. Quality Standard: Comply with requirements of AWI Section 300 for Standing and Running Trim.
- B. Wood Species for Opaque Finish: As indicated in Finish Legend in Drawings.
- C. Groove backs of flat trim members, and kerf backs of other wide, flat members, except for members with exposed ends in finished work.

2.10 PLASTIC LAMINATE CLAD CABINETS

- A. Quality Standard: Comply with requirements of AWI Section 400 Architectural Cabinets.
- B. Laminate Clad Panels:
 - 1. Core Material: Particleboard.
 - 2. Overall Thickness: Not less than 3/4 inch.
- C. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate (HPDL) complying with the following:
 - 1. Horizontal Surfaces other than Countertops: Grade HGS, 1.2 mm nominal thickness.
 - 2. Vertical Surfaces: Grade HGS, 1.2 mm nominal thickness.
 - 3. Edges: Grade HGS, 1.2 mm nominal thickness.
- D. Laminates for Semi-exposed Surfaces: Thermoset Decorative Overlay.
- E. Concealed Backs of Panels with Exposed Plastic Laminate Surfaces: High-pressure decorative laminate, Grade BKL.
- F. Colors, Patterns, and Finishes: Subject to compliance with requirements, provide products indicated for each designation in the Finish Legend in the Drawings.
- G. Apply plastic laminate cladding in full, uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline.
- H. Provide dust panels of 1/4 inch plywood or tempered hardboard above compartments and drawers, unless located directly under tops.

2.11 COUNTERTOPS

- A. Quality Standard: Comply with requirements of AWI Section 400 Architectural Cabinets.

- B. Type of Top: High pressure decorative laminate (HPDL), complying with the following:
1. HPDL Grade: HGS, General purpose type, 1.2 mm nominal thickness.
 - a. Postformed Surfaces: Grade HGP, 1.0 mm nominal thickness.
 2. Colors, Patterns, and Finishes: Subject to compliance with requirements, provide products indicated for each designation in the Finish Legend in the Drawings.
 3. Apply plastic laminate cladding in full, uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Locate counter butt joints minimum 2 feet from sink cutouts.
 4. Mechanically fasten back splash to countertops with steel brackets at 16 inches on center.
 5. Grain Direction: Parallel to cabinet fronts.
 6. Edges: Same as laminate cladding on horizontal surfaces.
 7. Core Material: Particleboard.
 - a. For countertops with sinks and lavatories, use Grade M-2-Exterior Glue particleboard or medium-density fiberboard made with exterior glue.
 8. Overall Thickness of Countertop Panel: Not less than 3/4 inch.
 9. Backer Sheet: Provide plastic laminate backer sheet, Grade BKL, on underside of countertop substrate.
- C. Type of Top: Solid surfacing, complying with the following:
1. Solid Surfacing Material Thickness: 3/4 inch.
 2. Fabricate tops one piece with shop applied backsplashes and edges.
 3. Comply with manufacturer's recommendations for fabrication, adhesives, sealers, and finishing.
 4. Drill holes for plumbing fittings and toilet accessories in the shop.
 5. Colors, Patterns, and Finishes: Subject to compliance with requirements, provide products indicated for each designation in the Solid Surfacing Material Schedule at the end of Part 3.

2.12 SHOP FINISHING

- A. Quality Standard: Comply with requirements for AWI Section 1500 Factory Finishing.
- B. General: Refer to Section 09 9000, Painting, for finishing opaque finished architectural woodwork.
1. To the greatest extent possible, finish architectural woodwork in the fabrication shop.
 2. Touch up, clean, and polish after installation at Project site.
- C. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing woodwork, as applicable to each unit of work.
- D. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling and end-grain surfaces.
1. Concealed surfaces of plastic laminate clad woodwork do not require backpriming when surfaced with plastic laminate, or thermoset decorative panels.

- E. Opaque Finish: Specified in Section 09 9000, Painting.

PART 3 EXECUTION

3.1 PREPARATION

- A. Condition architectural woodwork to prevailing humidity conditions in installation areas before installing.

3.2 INSTALLATION

- A. Quality Standard: Comply with AWI Section 1700 for the same grade specified for type of architectural woodwork involved, and as specified in this Section.
- B. Install architectural woodwork plumb, level, and straight.
 - 1. Shim as required with concealed shims.
 - 2. Install level and plumb to tolerance of 1/8 inch in 96 inches.
- C. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- D. Anchor woodwork to anchors or blocking built-in or directly attached to substrates as required for proper support and attachment.
- E. Countersink anchorage devices at exposed locations and fill flush with adjacent surfaces matching final finish.
- F. Standing and Running Trim:
 - 1. Install with minimum of joints possible.
 - 2. Do not use pieces less than 36 inches long, except where necessary.
 - 3. Stagger joints in adjacent and related members.
 - 4. Wood Base: Fill gaps between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base.
- G. Cabinets:
 - 1. Use concealed joint fasteners to align and secure adjoining cabinet units, and countertops.
 - 2. Carefully scribe cabinets abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
 - 3. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches on center.
 - 4. Secure cabinet and counter bases to floor using steel angles.
- H. Plastic Laminate Countertop:
 - 1. Anchorage: Secure countertops to grounds, furring and solid blocking with countersunk fasteners and blind nailing as required.
 - a. Mechanically fasten back splash to countertops with steel brackets at 16 inches on center.
 - 2. Seal space between backsplash and wall with sealant.

- I. Solid Surfacing Countertops:
 - 1. Secure tops to base units.
 - 2. Secure backsplashes to tops with adhesive.

3.3 ADJUSTING AND CLEANING

- A. Adjust hardware to center doors and drawers in openings.
- B. Adjust moving or operating parts to function smoothly and correctly.
- C. Adjust joinery for uniform appearance.
- D. Clean cabinets on exposed and semi-exposed surfaces.
- E. Touch up shop applied finishes and repair and restore damaged or soiled areas to eliminate functional and visual defects.
 - 1. Where it is not possible to repair defects, replace woodwork.

3.4 PROTECTION

- A. Provide protection and maintain conditions to ensure that casework is without damage or deterioration at time of Substantial Completion.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes fiberglass reinforced plastic wall paneling.
- B. Related Sections:
 - 1. Section 09 2900: Gypsum Board, for wall substrate.
 - 2. Section 09 9000: Painting, for wall surface primer.

1.2 SUBMITTALS

- A. Product Data: Provide data on wall panels and adhesive.
- B. Shop Drawings: Indicate panel and joint layout for each wall to receive panels.
- C. Samples: Two wall panels, 12 by 12 inches in size, illustrating color, finish, and texture.

1.3 QUALITY ASSURANCE

- A. Use skilled workmen trained and experienced in necessary crafts and familiar with requirements and methods needed for proper performance of Work of this Section.
- B. Provide wall coverings that comply with ASTM E 84 Test for Surface Burning Characteristics of Building Materials for the following Class A rating:
 - 1. Flame spread: 25 or less.
 - 2. Smoke density: 450 or less.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this Section with minimum three years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store panel material on solid flat surface to minimize package distortion.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the adhesive or fiberglass reinforced plastic panel product manufacturer.
- B. Maintain environmental conditions recommended by manufacturer 24 hours before, during, and after installation of fiberglass reinforced plastic panels.

1.7 FIELD MEASUREMENTS

- A. Prior to fabrication, verify that field measurements are as indicated in Shop Drawings.

PART 2 PRODUCTS

2.1 FIBERGLASS WALL PANELS

- A. Fiberglass reinforced wall panels, FRP-1: Where this designation is indicated provide fiberglass wall panels by one of the following:
 - 1. BP Chemicals, Inc.
 - 2. Crane-Kemlite.
 - 3. Lasco Panel Products.
 - 4. Marlite FRP Panels.
- B. Color: As indicated in Finish Legend in Drawings.

2.2 REINFORCED FIBERGLASS PANELS

- A. Panel Thickness: 0.09 inch.
- B. Panel Texture: As indicated in Finish Legend in Drawings.
- C. Panel Size: As required to minimize vertical joints. No horizontal joints allowed.
- D. Adhesive: Type recommended by panel manufacturer to suit application to substrate.
- E. Mechanical Fasteners: Non-corroding fasteners as recommended by manufacturer.
- F. Termination Trim: Vinyl caps, dividers and corner molding as required. Color to match panel.
- G. Sealant: Silicone sealant as recommend by manufacturer. Color to match panel and trim.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine wall, area, and conditions where installation of Work of this Section will occur.
- B. Verify that substrate surfaces are ready to receive work, and conform to requirements of the fiberglass reinforced plastic panel manufacturer.
- C. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet nor vary at a rate greater than 1/16 inch/ft.

3.2 PREPARATION

- A. Fill cracks and smooth irregulars with filler; sand smooth.
- B. Remove electrical, telephone, and wall plates and covers.
- C. Apply primer sealer to substrate surfaces as specified in Section 09 9000.
- D. Vacuum clean surfaces free of loose particles.

3.3 INSTALLATION

- A. Install wall panels with adhesive in accordance with manufacturer's instructions.
- B. Mechanical fasten termination trim along panel bottoms and edges.

- C. Apply caulking to termination trim pieces following installation of panels. Remove excess caulking.
- D. Remove excess wet adhesive. Wipe clean with dry cloth.

3.4 CLEANING

- A. Clean wall panels of excess adhesive, dust, dirt, and other contaminants.
- B. Reinstall wall plates and accessories removed prior to installation of Work of this Section.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes field-applied plastic laminate wall surfacing.
- B. Related Sections:
 - 1. Section 09 2900: Gypsum Board, for wall substrate.
 - 2. Section 09 9000: Painting, for wall surface primer.
 - 3. Division 22: Plumbing, for plumbing incorporated in wall surfacing.
 - 4. Division 23: Heating, Ventilating, and Air Conditioning, for mechanical grilles incorporated in wall surfacing.
 - 5. Division 26: Electrical, for electrical work incorporated in wall surfacing.

1.2 SUBMITTALS

- A. Product Data: For plastic laminate.
- B. Shop Drawings: Showing layout and dimensioned joint locations.
- C. Samples: Two 8 by 10 inch size samples for each color, texture, and pattern of plastic laminate.

1.3 QUALITY ASSURANCE

- A. Use skilled workers trained and experienced in crafts and familiar with requirements and methods needed for proper performance of work of this Section.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store above ground, under cover and protected from damage.

1.5 ENVIRONMENTAL CONDITIONS

- A. Maintain 60 degrees F minimum temperature.
- B. Maintain 30 ft.-candles minimum measured 3 ft. above floor during installation.
- C. Maintain 35 percent minimum to 80 percent maximum humidity.

1.6 FIELD MEASUREMENTS

- A. Field verify dimensions prior to fabrication.

PART 2 PRODUCTS

2.1 PLASTIC LAMINATE

- A. Plastic Laminate (PL): High pressure decorative laminate (HPDL), General Purpose type, NEMA LD3, types as indicated; manufacturer, color, pattern, and surface texture as indicated in Finish Legend in Drawings.
- B. Joint Sealant: Clean translucent mildew-resistant silicone by Dow, General Electric, or approved.

2.2 ACCESSORIES

A. Metal Trim:

1. B & T Metals Chromedge
2. Colotrym.
3. Substitutions: Submit according to requirements of Section 01 2500.

B. Adhesive: Aliphatic resin, Resorcinol, or approved.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which work of this Section will be performed.

1. Correct conditions detrimental to proper completion of work.
2. Do not proceed until unsatisfactory conditions are corrected.

3.2 COORDINATION

A. Coordinate as required with other trades to assure proper and adequate provision in work of those trades for interface with work of this Section.

B. Cut and fit work of this Section as necessary to interface with plumbing, mechanical or electrical work incorporated in wall s receiving plastic laminate surfacing.

C. Protect work of others from damage.

3.3 INSTALLATION

A. Install work of this Section in accordance with Drawings and manufacturer's and referenced standard's recommended installation procedures.

B. Wall Surfacing:

1. Install plastic laminate directly to wall without in-plane seams.
2. Provide metal edge trim with mitered corners; trim joints to be tight.
3. Make joints flush, tight and nearly invisible

C. Promptly remove excess adhesive or sealant.

3.4 CLEANING AND PROTECTION

A. Clean plastic laminate surfacing with cleaning materials recommended by manufacturer.

B. Provide protection for completed work of this Section.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes the following:

1. Blanket insulation.
2. Vapor retarders.

B. Related Sections:

1. Section 06 1000: Rough Carpentry, for exterior wall framing to receive blanket insulation.
2. Section 07 5100: Built-up Bituminous Roofing, for insulation specified as part of roofing system.
3. Section 09 2116: Gypsum Board Assemblies, for acoustical sealant used in gypsum board assemblies.

1.2 PERFORMANCE REQUIREMENTS

- A. Provide with materials of this Section a continuity of thermal and vapor barrier at building enclosure elements.

1.3 SUBMITTALS

- A. Product Data: For each type of building insulation and vapor retarder specified.

1.4 QUALITY ASSURANCE

- A. Engage a company using workers who are trained and experienced in necessary crafts and familiar with requirements and methods needed for proper performance of Work of this section.

- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined per test method indicated below:

1. Surface-Burning Characteristics: ASTM E 84.
2. Fire-Resistive Ratings: ASTM E 119.
3. Combustion Characteristics: ASTM E 136.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources.

- B. Store inside and in a dry location.

- C. Comply with manufacturer's instructions for handling, storing, and protecting during installation.

- D. Do not expose plastic insulation to sunlight, except to extent necessary for period of installation and concealment. Complete installation and concealment of plastic materials as rapidly as possible.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by one of the manufacturers specified in Part 2 articles
- B. Substitutions: Submit according to requirements of Section 01 2500.

2.2 BLANKET INSULATION MATERIALS

A. Faced Blanket Insulation:

1. Manufacturers:

- a. Design Standard: Johns Manville Kraft-Faced Formaldehyde-free Thermal Insulation."
- b. Other Acceptable Manufacturers, subject to compliance with formaldehyde-free requirement for insulation products:

- 1) CertainTeed Corporation.
- 2) Owens Corning.

2. ASTM C 665, Type II, Class C.

3. Type: Glass-fiber.

4. Vapor Retarder: Kraft, with 1.0 maximum permeability.

5. Provide min. 1 inch wide flange along edges for attachment to framing

6. Thickness:

- a. Roof: As required to achieve insulation-only R-Value of 30.
- b. Wall: As required to achieve insulation-only R-Value of 19.

2.3 ACCESSORIES

- A. Vapor-Retarder Tape: Pressure sensitive tape of type recommended by insulation manufacturer for sealing joints and penetrations in vapor retarder facings.
- B. Fasteners and Adhesives: As recommended by insulation manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrates and conditions for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.
- B. Coordinate as required with other trades to assure proper and adequate provision in Work of this Section.

3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.
- C. Extend insulation in thickness indicated to envelope entire area to be insulated. Cut and fit around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

3.4 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrates by method indicated, or if no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Install vapor retarding faced units with vapor retarder to warm side of assembly.
 - 1. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
 - 2. Tape seal butt ends, lapped flanges, and tears or cuts in membrane to form a continuous barrier.
- C. Install mineral-fiber insulation in cavities formed by framing members as follows:
 - 1. Use blanket widths and lengths that completely fill cavities formed by framing members.
 - 2. Place insulation cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Cut and fit tightly around obstructions and fill voids with insulation.
 - 4. Place insulation between pipes in wall and exterior side of assembly. Leave no gaps or voids.
 - 5. Maintain 3 inch clearance of insulation around recessed lighting fixtures.
 - 6. Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
 - 7. For wood framed construction, install insulation blankets according to ASTM C 1320 and as follows:
 - a. With faced blankets having stapled flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.

3.5 INSTALLATION OF VAPOR RETARDERS

- A. General: Extend vapor retarder to extremities of areas to be protected from vapor transmission.
 - 1. Secure in place with adhesives or other anchorage system.
 - 2. Extend vapor retarder to cover miscellaneous voids in insulated substrates.

- B. Wood Framing: Seal vertical joints in vapor retarders over framing. Fasten vapor retarders to framing at top, end and bottom edges; at perimeter wall openings; and at lap joints.
- C. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor retarder tape to create an airtight seal between penetrating objects and vapor retarder.
- D. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor retarder taper or another layer of vapor retarder.

3.9 PROTECTION

- A. Protect installed insulation and vapor retarders from damage, both from weather exposure or construction operations.
- B. Repair damaged insulation and vapor retarders.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes weather-resistive barriers for wall application.
- B. Related Sections:
 - 1. Section 06 100: Rough Carpentry, for wall sheathing to receive weather-resistive barrier and protection during construction.
 - 2. Section 07 4646: Mineral-Fiber Cement Siding, for finish materials installed over weather-resistive barrier.
 - 3. Section 07 6000: Flashing and Sheet Metal, for flexible flashing installed at wall openings coordinated with installation of weather-resistive barrier.

1.2 SUBMITTALS

- A. Product Data for each type product specified.
- B. Research or evaluation reports acceptable to authorities having jurisdiction indicating compliance with State Building Code for weather-resistive barriers.

1.3 PRE-INSTALLATION CONFERENCE

- A. Convene a pre-installation conference in coordination with pre-installation conference for placement of concrete floor slabs within two weeks prior to commencing work of this Section.
- B. Review installation procedures and coordination required with related work for placement of air barriers.

PART 2 PRODUCTS

2.1 BUILDING PAPER

- A. Building Paper: Water-vapor-permeable, kraft building paper, except that water resistance shall not be less than 1 hour and water-vapor transmission shall not be less than 75 g/sq. m x 24 h, meeting requirements of IBC Section 1404.2 as an alternate weather-resistive barrier.
 - 1. Product: Fortifiber Building System Group "Super Jumbo Tex 60 Minute."

2.3 FASTENERS

- A. Type as recommended in writing by weather resistant barrier manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify substrate materials are sound, dry, and clean.
- B. Coordinate installation of weather-resistive barrier with flexible membrane flashing specified in Section 07 6000 installed at wall openings and penetrations.

3.2 INSTALLATION

- A. General: Cover sheathing with weather-resistant sheathing paper.
- B. Building Paper:
 - 1. Install in accordance with manufacturer's instructions.
 - 2. Run horizontally, shingle fashion.
 - 3. Lap 4 inches horizontally and 12 inches vertically.
 - 4. Fasten to sheathing with galvanized staples or roofing nails.
 - 5. Seal seams, edges, fasteners, and penetrations with tape.
 - 6. Extend into jambs and sills of openings and seal corners with tape.
 - 7. Coordinate installation of building paper with flexible membrane flashing installed at wall openings.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes sheet materials for controlling vapor diffusion under concrete floor slabs-on grade.
- B. Related Sections:
 - 1. Section 03 3000: Cast-In-Place Concrete, for concrete placed over vapor retarder.
 - 2. Section 31 2000: Earth Moving, for underslab aggregate base substrate for vapor retarder.

1.2 SUBMITTALS

- A. Product Data for each type product specified.

1.3 PRE-INSTALLATION CONFERENCE

- A. Convene a pre-installation conference in coordination with pre-installation conference for placement of concrete floor slabs within two weeks prior to commencing work of this Section.
- B. Review installation procedures and coordination required with related Work for placement of concrete and concrete slab steel reinforcement on vapor retarder.

PART 2 PRODUCTS

2.1 SHEET MATERIALS

- A. Vapor Retarder: Meet minimum requirements of ASTM E 1745, Class B, 10 mil thickness.
 - 1. ASTM E 1745, Class B Requirements:
 - a. Water Vapor Permeance: 0.3 perms.
 - b. Maximum Tensile Strength: 30.0 lbf/in.
 - c. Puncture Resistance: 1700 grams.
 - 2. Acceptable Products:
 - a. Floor Seal Technology, Inc.: TruBarrier.
 - b. Fortifiber Building Systems Group: Moistop Ultra 6 Underslab Vapor Retarder.
 - c. W. R. Grace & Co.: Florprufe 120.
 - d. W. R. Meadows: Vapor-Mat 10 mil or 15 mil.
 - e. Raven Industries, Inc.: Dura-Skrim D16WB.
 - f. Reef Industries, Inc.: Griffolyn Type-85 Vapor Retarder.
 - g. Stego Industries, LLC: Stego Wrap 10 mil or 15 mil Vapor Barrier.
- B. Vapor Retarder Tape: High density polyethylene tape with pressure sensitive adhesive, by manufacturer of vapor retarder, 4 inches width.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Verify substrate materials are dry and clean. Remove loose or foreign matter that might impair adhesion.
- B. Coordinate with work of other sections for location and treatment of penetrations through vapor retarder, and placement of concrete and concrete reinforcement over vapor retarder.

3.2 INSTALLATION

- A. Place, protect, and repair vapor retarder according to requirements and recommendations of ASTM E 1643 without granular fill, and manufacturers written instructions.
 - 1. Lap joints 6 inches and seal with recommended pressure sensitive tape.
 - 2. Turn vapor retarder up over end of concrete slab-on-grade and seal to foundation wall. Leave end of vapor retarder exposed above top of slab.
 - 3. Seal pipe penetrations with pipe boot made from vapor retarder and tape according to manufacturer's instructions.
 - 4. Protect vapor retarder from damage during installation of reinforcing steel and utilities.
 - 5. Repair damaged areas by cutting patches of vapor retarder, overlapping damaged areas 6 inches and taping all four sides with pressure sensitive tape.
- B. Note: Vapor retarder may be identified as "vapor barrier" in drawings.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes preformed, field assembled, nonstructural metal roof panels, and associated integral flashing.
- B. Related Sections:
 - 1. Section 01 4115: Design Build Requirements.
 - 2. Section 06 1000: Rough Carpentry, for plywood substrate.
 - 3. Section 07 6000: Flashing and Sheet Metal
 - 4. Section 07 9200: Joint Sealants, for field-applied sealants not otherwise specified in this Section.

1.2 DEFINITIONS

- A. Metal Roof Panel Assembly: Metal roof panels, attachment system components, and accessories necessary for a complete weathertight system.
- B. Steel Sheet Thickness: Minimum thickness of base metal without metallic coatings or painted finishes.

1.3 PERFORMANCE REQUIREMENTS

- A. Design Requirements: Provide an attachment schedule signed by a professional engineer licensed in the State of Oregon and supporting calculations for UL 580, Class 90 wind uplift rating.
- B. Air Infiltration: Not to exceed 0.06 cfm/lineal. ft. of panel seam at 1.57 psf positive, and 0.07 cfm/lineal. ft of panel seam at negative pressure, when tested in accordance with ASTM E 283.
- C. Water Penetration: No leakage at 6.24 psf when tested in accordance with ASTM E 331.
- D. Wind Uplift Resistance: Provide metal roof panels that comply with UL 580 for Class 90.

1.4 SUBMITTALS

- A. Product Data, for each type of specified product, on metal types, finishes, and characteristics, including installation instructions.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashing, terminations, and installation details.
- C. Samples: Two samples for each exposed finish.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with SMACNA standard details and requirements.
- B. Provide metal panels that comply with UL 580, Class 90.
 - 1. Field formed panels are not allowed.
- C. Installer Qualifications: An employer of workers trained and approved by manufacturer.

1.6 WARRANTY

- A. Manufacturer's Warranty: Provide twenty year warranty. Include coverage for structural failure, degradation of metal finish, perforation, rupture, or leak due to corrosion. Warranty to cover entire system, including framing, flashing, counterflashing, gutters, and accessories.
- B. Contractor's Warranty: Provide two year warranty. Include coverage for water tightness and integrity of seals.

PART 2 PRODUCTS

2.1 ROOF PANELS

- A. Manufacturer: AEP-SPAN (formerly IMSA Building Products, Inc.).
 - 1. Product: "Reversed Box Rib"
 - 2. Configuration: Through-fastened panel, 1-1/2 inches high, 36 inches wide, with 1-3/8 inch wide ribs spaced at 7.2 inches on center.
- B. Substitutions: Submit in accordance with requirements of Section 01 2500.

2.2 PANEL MATERIALS

- A. Sheet Steel: ASTM A 924 / A 792 Grade 40, 0.0209 inch (24 gage) thickness.
 - 1. Protective Coating: ASTM A 924 / A 792, Zincalume AZ50 coating.
 - 2. Finish: "DuraTech 5000" Polyvinylidene Fluoride; 70 percent Kynar 500 or Hylar 5000 resins, minimum 0.2 mil thick corrosion-resistant primer, and 0.8 mil thick PVF₂ finish coat for a total of 1.0 mil dry film thickness.
 - a. Color: Match existing silver/galvanized finish.

2.3 ACCESSORIES

- A. Fasteners: Zinc coated and prefinished to match sheet metal where exposed to view; with soft neoprene washers, as recommended by panel manufacturer.
- B. Underlayment: ASTM D 226, Type II, No. 30 asphalt saturated roofing felt, unless otherwise recommended by metal roof panel manufacturer.
- C. Self-Adhering, High Temperature, Polyethylene-Faced Sheet Underlayment: ASTM D 1970, 0.030 inch thick composite waterproofing sheet with polyolefin film laminated to rubberized asphalt.
 - 1. Product: Vycor Ultra, by W. R. Grace & Co., or approved.
- D. Sealant: One-part polyurethane type, low modulus, Type II, Class A, as manufactured by Tremco, Sonneborn, Contech, General Electric, Pecora, or approved.
- E. Bedding Compound: Butyl type, 1 x 1/8 inch, as manufactured by Tremco, Chemco, or approved.
- F. Anchors: Per manufacture's recommendations and as required to meet UL 580, Class 90 wind uplift rating.
- G. Flashing: Material, gage and finish to match panels.

2.4 SHOP FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form panels in full length of sloped roof length, where possible.
- C. Fabricate each metal flashing section in 10 foot runs.
- D. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendation in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify roof deck is dry, free of snow or ice, clean and smooth, free of depressions, waves, or projections, and properly sloped.
- B. Verify field dimensions are as indicated in shop drawings prior to fabrication.
- C. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, reglets are in place, and nailing strips located.

3.2 PREPARATION

- A. Install flashings and other sheet metal to comply with requirements of Section 07 6000.

3.3 INSTALLATION - GENERAL

- A. Apply underlayment in single layer from eave to ridge, laid perpendicular to slope; weather lap edges 4 inches and nail in place. Minimize nail quantity; ensure that nail heads do not contact metal roof panels.
- B. Apply self-adhering, high temperature, polyethylene-faced sheet underlayment at valleys, minimum 36 inches wide, and at other locations indicated or recommended by roof panel manufacturer.
- C. Install metal roofing in accordance with roofing manufacture's instructions.
- D. Use bedding compound for joints between metal and bitumen or metal and felts.
- E. Secure flashing in place using concealed fasteners. Connect units with specified joints and sealant. Fasten to surfaces at 6 inches o.c. minimum, with approved fasteners.
- F. Insulate dissimilar metal and incompatible surfaces with No. 30 felt, or as approved.
- G. Seal metal joints watertight.

3.4 METAL PANEL INSTALLATION

- A. Lay sheets with long dimension perpendicular to eaves. Apply pans beginning at eaves.
- B. Fully engage interlocking seams.
- C. Lap joints minimum 6 inches in direction of drainage.

3.5 CLEANING AND REPAIRING

- A. Touch-up damaged paint.
- B. Sweep clean panels, flashing and gutters.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes the following fiber-cement products:

1. Panel siding.

B. Related Sections:

1. Section 06 1000: Rough Carpentry, for building framing and sheathing.
2. Section 06 2000: Exterior Finish Carpentry, for wood trim.
3. Section 07 2500: Weather Barriers
4. Section 07 6000: Flashing and Sheet Metal.
5. Section 07 9200: Joint Sealants
6. Section 09 9000: Painting, for field-applied finish.

1.2 SUBMITTALS

A. Product Data, for each type of product specified, including manufacturer's specifications and recommended details and methods for installation.

B. Samples: 12 inches by width of unit, or 12 by 12 inch for panel products, of each type and texture specified.

1.3 QUALITY ASSURANCE

A. Use skilled workers trained and experienced in necessary crafts and familiar with requirements and methods needed for proper performance of Work of this Section.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store products stacked on edge, or laid flat on a smooth, level surface.

B. Store off ground, under cover and protected from damage.

1. If products become wet, allow to dry thoroughly before installing.

1.5 PROJECT CONDITIONS

A. Weather Limitations: Proceed with siding installation only if substrate is completely dry and if existing and forecasted weather conditions permit siding to be installed according to manufacturer's written instructions.

1.6 COORDINATION

A. Coordinate with other trades affecting or affected by Work of this Section.

1.7 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard 30 year, transferable, warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products from one of the following:
 - 1. CertainTeed Corporation.
 - 2. James Hardie Building Products.
- B. Substitutions: Submit in accordance with requirements of Section 01 2500.

2.2 FIBER-CEMENT SIDING

- A. Fiber-Cement Siding: ASTM C 1186, Type A, Grade II, non-asbestos fiber-cement flat sheets.
- B. Panel Siding:
 - 1. CertainTeed Corporation: "WeatherBoards" Vertical Siding complying with the following:
 - a. Thickness: 5/16 inch.
 - b. Weight: 2.6 lbs/sq. ft.
 - c. Size: 4 by 8, 9 or 10 feet, as required to reduce horizontal joints to a minimum.
 - d. Texture: "Cedar Panel," no grooves.
 - 2. James Hardie Building Products: "Hardipanel" Vertical Siding complying with the following:
 - a. Thickness: 5/16 inch.
 - b. Weight: 2.3 lbs/sq. ft.
 - c. Size: 4 by 8, 9 or 10 feet, as required to reduce horizontal joints to a minimum.
 - d. Texture: "Cedarmill."
- C. Exterior Trim:
 - 1. Species: Specified in Section 06 2000.
 - 2. Size: As indicated in Drawings.
- D. Wood Battens:
 - 1. Species: Specified in Section 06 2000 for exterior trim.
 - 2. Size: As indicated in Drawings.

2.3 ACCESSORIES

- A. Flashing: Provide metal flashing complying with Section 07 6000 at window and door heads and where indicated.
 - 1. Finish: Same color as siding.
- D. Weather Barrier: Specified in Section 07 2500.
- C. Joint Sealant: Specified in Section 07 9200.

- D. Fasteners: Corrosion resistant fasteners as recommended and approved by siding manufacturer for 90 MPH wind speed, exposure category B, as described in Tables 2 and 3 in National Evaluation Service Report No. NER-405, and as follows:
 - 1. Use only hot-dipped galvanized or stainless steel nails. Use only stainless steel fasteners where exposed to weather.
 - 2. Do not use electro-galvanized nails.

2.4 FACTORY PRIME FINISH

- A. Factory seal and prime, front and back of each unit, with manufacturer's acrylic factory sealing and priming system, compatible with finish paint specified in Section 09 9000.
 - 1. James Hardie Building Products: "PrimePlus."
 - 2. CertainTeed Corporation: "Fibertect."
- B. For fiber-cement products not available factory primed, front and back, field prime as specified in Section 09 9000, "Painting."

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that Surfaces to receive siding are straight, plumb, true, solid, rigid, dry, and otherwise properly prepared.
- B. Correct conditions detrimental to timely and proper completion of work.
- C. Verify weather barrier has been installed over entire substrate to receive siding as specified in Section 07 2500, and is without damage.
- D. Repair damaged weather barrier and other unsatisfactory conditions prior to start of siding work.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's written installation instructions over weather barrier on wall sheathing.
- B. Fasten to solid backing in accordance with National Evaluation Service Report No. NER-405 for specified wind resistance.
- C. Install straight, plumb, level, parallel, true, and secure as appropriate.
- D. Fit neatly at joints against trim.
- E. Accurately scribe to adjacent surface irregularities.
- F. Fit accurately and neatly around any projections through siding.
- G. Install fiber-cement products so that they are not in ground contact or subjected to standing water.
- H. Panel Siding:
 - 1. Install blocking behind all joints where joints do not occur at stud framing.

2. Place fasteners no closer than 3/8 inch from panel edges, and no closer than 2 inches from panel corners.
3. Space fasteners as recommended by manufacturer for stud spacing and 90 MPH wind speed; 6 inches at edges and 12 inches in field for studs at 16 inches OC.
4. Space panels with a 1/8 inch maximum gap, horizontally and vertically.
5. Drive fasteners perpendicular to siding and framing.
6. Cover joints with lumber batten.
7. Install metal "Z" flashing at horizontal butt joints.
8. Install to maximum variation in alignment of 1/8 inch in 10 linear feet.

I. Exterior Trim:

1. Install as recommended by manufacturer for specified wind speed.

J. Battens:

1. Install over vertical panel joints and at intermediate locations between panel joints as indicated in Drawings.
2. Install in 2 piece vertical assemblies at outside corners,
3. Install vertical battens full height without horizontal joints.
4. Install over horizontal panel joints in continuous band to interrupt vertical battens above and below horizontal batten, as indicated in Drawings.

3.3 FINISH

- A. For fiber-cement products that have not been factory primed, field prime front and back of each unit as specified in Section 09 9000, "Painting."
- B. Field finish as specified in Section 09 9000, "Painting."

3.4 ADJUSTING AND CLEANING

- A. Remove damaged, improperly installed, or otherwise defective siding materials and replace with new materials complying with specified requirements.
- B. Clean finished surfaces according to siding manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Built-up bituminous membrane roofing.
2. Roofing insulation.
3. Cover board.

B. Related Sections:

1. Section 01 4500: Quality Control, for inspection procedures required by manufacturer's technical representative.
2. Section 06 1000: Rough Carpentry, for roof sheathing, wood blocking, curbs, cants, and nailers
3. Section 07 6000: Flashing and Sheet Metal.
4. Division 22: Plumbing, for roof drains and vents.

1.2 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work not otherwise defined in this Section.

B. Hot Roofing Asphalt: Roofing asphalt heated to its equiviscous temperature, the temperature at which its viscosity is 125 centipoise for mop-applied roofing asphalt and 75 centipoise for mechanical spreader-applied roofing asphalt within a range of plus or minus 25 degrees F measured at the mop cart or mechanical spreader immediately before application.

1.3 SYSTEM DESCRIPTION

A. Built-up Roofing System: Four-ply, mineral-surfaced fiberglass, hot mopped modified bitumen roofing system over cover board on insulation installed over plywood substrate.

1.4 PERFORMANCE REQUIREMENTS

A. General: Install a watertight, built-up bituminous membrane roofing and base flashing system with compatible components that will not permit the passage of liquid water and will withstand wind loads, thermally induced movement, and exposure to weather without failure.

B. FMG Listing: Provide built-up bituminous membrane, base flashing, and component materials that meet requirements of FMG 4450 and FMG 4470 as part of a roofing system and that are listed in FMG's "Approval Guide" for Class I, or noncombustible construction, as applicable. Identify materials with FM markings.

C. Roofing system shall comply with the following:

1. Windstorm Classification: FMG Class IA-90.
2. Fire Classification: UL 790 or ASTM E 108, Class A fire performance.
3. Hail Resistance: MH

1.5 SUBMITTALS

A. Product Data: For each type of roofing product specified. Include data substantiating that materials comply with requirements.

- B. Shop Drawings: Include plans, sections, details and attachments to other work, including the following:
 - 1. Base flashings, cants, and, membrane terminations.
 - 2. Tapered insulation, including slopes.
 - 3. Insulation fastening patterns.
 - 4. Crickets, saddles, and tapered edge strips, including slopes.
- C. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install specified roofing system and is eligible to receive the standard roofing manufacturer's warranty.
- D. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience, and approval, authorization, or license by the roofing system manufacturer. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- E. Product Test Reports: Based on evaluation of tests performed by manufacturer and witnessed by a qualified independent testing agency, indicate compliance of components of roofing system with requirements based on comprehensive testing of current product compositions.
- F. Maintenance Data: For roofing system to include in the maintenance manuals specified in Division 1.
- G. Warranty: Sample copy of standard roofing manufacturer's warranty stating obligations, remedies, limitations, and exclusions of warranty.
- H. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roof installation.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA Waterproofing Manual and manufacturer's instructions.
- B. Source Limitations: Furnish products by, or approved by, the manufacturer of the roofing system for the entire roofing system.
- C. Installer Qualifications: An experienced installer who is approved, authorized, or licensed by the roofing system manufacturer to install manufacturer's product prior to the date of bid, in writing; and who is eligible to receive the standard roofing manufacturer's warranty.
 - 1. Installer shall designate a single individual as project foreman who shall be on site at all times during installation and who shall have certification of training by roofing system manufacturer.
- D. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method indicated below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Exterior Fire-Test Exposure: Class A; complying with UL 790 or ASTM E 108, for application and slopes indicated.

1.7 PRE-INSTALLATION CONFERENCE

- A. Convene a pre-installation conference within two weeks prior to commencing Work of this section.
- B. Review installation procedures and coordination required with related Work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.
- B. Store products in weather protected environment, clear of ground and moisture.
 - 1. Protect foam insulation from direct sunlight exposure.
 - 2. Stand roll materials on end.
- C. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

1.9 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with roofing work only when existing and forecasted weather conditions permit roofing to be installed according to manufacturers' written instructions and warranty requirements.

1.10 SEQUENCING AND SCHEDULING

- A. Coordinate Work of installing associated metal flashing as the Work of this section proceeds.

1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to replace components of roofing system manufacturer that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
 - 1. Warranty includes roofing membrane, base flashing, roofing membrane accessories, roof insulation, fasteners, cover boards, walkway products, and other components of roofing system.
 - 2. Warranty Period: 10 years.
- A. Roofing Installers Warranty: Submit roofing Installer's warranty, on warranty form signed by Installer, covering Work of this Section, covering all components of roofing system such as roofing membrane, base flashing, roof insulation, fasteners, cover boards, and for the following warranty period:
 - 1. Warranty Period: 2 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS AND SYSTEMS

- A. Acceptable Roofing Systems: Subject to compliance with requirements, provide products by one of the following:
 - 1. Johns Manville 4GIC-VI, with ASTM D2178 Type VI felts.
 - 2. Malarky Roofing M4-WI-BIA-H.

- B. Substitutions: Submit in accordance with requirements of Section 01 2500.

2.2 SHEET MATERIALS

- A. Glass Fiber Felts: ASTM D 2178, Type VI; tensile strength, minimum 60 lbs in machine and cross directions. "GlasPly Premier" by Johns Manville, or approved.
- B. Base Flashing: Reinforced modified bitumen membrane flashing; fiberglass scrim, 2 polyester mats, elastomeric base material of SBS rubber and asphalt, with ceramic granule surface. "DynaFlex" by Johns Manville, or approved.
- C. Mineral Surfaced Felts: ASTM D 3909; "GlasKap" by Johns Manville, or approved.

2.3 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended by roofing system manufacturer for intended use and compatible with SBS-modified bituminous roofing membranes.
 - 1. Furnish liquid-type auxiliary materials that meet VOC limits of authorities having jurisdiction.
- B. Roofing Asphalt: ASTM D 312, Type as recommended by roofing manufacturer.
- C. Cold Applied Adhesive: Roofing system manufacturer's standard asphalt based, one or two part, asbestos free, cold applied adhesive specially formulated for compatibility and use with roofing membrane and base flashing.
- D. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing system manufacturer for application.
- E. Mastic Sealant: Polyisobutylene, plain or modified bituminous, nonhardening, nonmigrating, nonskinning, and nondrying.
- F. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions of FMG 4470; designed for fastening base sheets, base-ply felts, and base flashings and for backnailing bituminous membrane to substrate; tested by manufacturer for required pullout strength; and acceptable to roofing system manufacturer.
 - 1. Metal and Wood Decks: "UltraFast Fasteners" by Johns Manville, or approved.
- G. Metal Flashing Sheet: Metal flashing sheet is specified in Section 07 6000.
- H. Wood Cants and Nailer Strips: Furnish preservative treated wood cants and nailer strips complying with requirements of Section 06 1000.
- I. Sealant in Contact with Roof Membrane Materials: Neoprene as manufactured by Gibson/Holman, or approved by roofing membrane manufacturer.
- J. Termination Bar: As recommended by system manufacturer.
- K. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer for intended use.

- L. Parapet Flexible Membrane Flashing: Rubberized asphalt, reinforced, self-adhering membrane, minimum 40 mil thickness.
 - 1. Johns Manville, "SureGrip" Ice and Water Guard.
 - 2. W.R. Grace & Co., "Vycor V40" Weather Barrier Strips, Self-Adhered Weather Resistive Barrier.
 - 3. W. R. Meadows, Inc., Sealtight "Air-Shield" Self-Adhering Air-Barrier and Flashing Membrane.

2.4 INSULATION MATERIALS

- A. General: Provide preformed, roofing insulation boards that comply with requirements, selected from manufacturer's standard sizes and of thickness indicated.
 - 1. Provide preformed, tapered insulation boards where indicated, or required, for sloping to drains. Fabricate with in-place taper of 1/4 inch per 12 inches, unless otherwise indicated.
 - 2. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drains. Fabricate to slopes indicated.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Facer Type II, Class 1; HCFC Free.
 - 1. Nominal density per ASTM D 1622: 2 lbs per cu. ft.
 - 2. Thickness: As required to provide minimum aged, insulation-only thermal resistance value of R=19.
 - 3. Product: ACFoam-II by Atlas Roofing Corporation, or approved.

2.5 INSULATION ACCESSORIES

- A. General: Furnish roofing insulation accessories recommended by insulation manufacturer for intended use and compatible with sheet roofing material.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions of FM 4470, designed for fastening roofing insulation to substrate, tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.
 - 1. "UltraFast" by Johns Manville, or approved.
- C. Cants and Nailer Strips: Furnish preservative treated wood cants and nailer strips complying with requirements of Section 06 1000.
- D. Tapered Edge Strips: ASTM C 728, rigid, perlite insulation board.
 - 1. "FesCant" by Johns Manville, or approved.
- E. Insulation Cover Board: ASTM C 1177, glass mat faced gypsum board, 1/4 inch thick; DensDeck Prime; by G-P Gypsum Corporation.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions under which roofing will be applied, with installer present, for compliance with requirements.

- B. Verify that roof openings and penetrations are in place and set and braced and that roof drains are properly clamped into position.
- C. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at roof penetrations and terminations and match the thickness of insulation required.
- D. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch out of plane.
- E. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install built-up bituminous membrane roofing system according to roofing system manufacturer's written instructions and applicable recommendations of NRCA.
- B. Start installation of built-up bituminous membrane roofing in presence of roofing system manufacturer's technical personnel.
- C. Shingling Plies: Install built-up bituminous membrane roofing system with ply sheets shingled uniformly to achieve required number of membrane plies throughout. Shingle in direction to shed water.
- E. Wood Nailers: Install and secure wood nailers to substrate at perimeter of roof in accordance with requirements of FMG I-49 Loss Prevention Data Sheet for Perimeter Flashing.
- F. Cant Strips: Install and secure 45 degree cant strips at junctures of built-up bituminous membrane roofing system with vertical surfaces or angle changes greater than 45 degrees.
- G. Cooperate with inspecting and testing agencies engaged or required to perform services for installing built-up bituminous membrane roofing system.
- H. Coordinate installing roofing system components so insulation and roofing plies are not exposed to precipitation or left exposed at the end of the workday or when rain is forecast.
 - 1. Provide cutoffs at end of each day's work to cover exposed ply sheets and insulation with a course of coated felt with joints and edges sealed.
 - 2. Complete terminations and base flashing and provide temporary seals to prevent water from entering completed sections of roofing system.
 - 3. Remove and discard temporary seals before beginning work on adjoining roofing.
- I. Asphalt Heating: Heat roofing asphalt and apply at not less than 425 degrees F (equiviscous temperature), unless otherwise required by roofing system manufacturer. Do not raise roofing asphalt temperature above the equiviscous temperature range more than one hour before time of application. Do not exceed roofing asphalt manufacturer's recommended temperature limits during roofing asphalt heating. Do not heat roofing asphalt within 25 degrees F of flash point. Discard roofing asphalt maintained at a temperature exceeding 500 degrees F for more than 4 hours. Keep kettle lid closed, unless adding roofing asphalt.

- J. Coordinate Work of this section with Work of other trades and sections to assure proper and adequate provision in Work of others for interface with Work of this section.

3.4 INSULATION APPLICATION

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with roofing system manufacturer's written instructions for installing roofing insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated and to Shop Drawings.
- D. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
- E. Install one or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2 inches or greater, install required thickness in 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
- F. Trim surface of insulation where necessary at roof drains so completed surface is flush with ring of drain.
- G. Install insulation with long joints of insulation in continuous straight lines with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
 - 1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
- H. Attached Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roofing insulation to deck type indicated.
 - 1. Mechanically fasten insulation according to recommendations in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
- I. Install insulation cover board over base insulation with long joints in continuous straight lines with end joints staggered between rows. Loosely butt cover boards together and fasten to roof deck according to roofing system manufacturer's written instructions. Tape joints of cover boards.

3.5 ROOF MEMBRANE INSTALLATION

- A. General: Install built-up bituminous membrane over area to receive roofing, according to manufacturer's written instructions. Extend built-up bituminous membrane over and terminate beyond cants.
 - 1. Unroll sheet and allow it to relax for the minimum time period required by manufacturer.
- B. Four-Ply, Built-Up Bituminous Membrane: Install 4 plies of built-up bituminous membrane, starting at low point of roofing system.
 - 1. Adhere to substrate in a solid mopping of hot roofing asphalt.

2. Apply roof felts, weather lap edges and ends, adhered to substrate in a solid mopping of hot roofing asphalt applied at not less than 425 degree F at a rate of 25 lb/square of bitumen per ply.
- C. Laps: Accurately align sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Completely bond and seal laps, leaving no voids.
 1. Repair tears and voids in laps and lapped seams not completely sealed.
 2. Apply granules, while asphalt is hot, to cover asphalt bead exuded at laps.
- D. Install built-up bituminous membranes with side laps shingled with slope of roof deck where possible.
- E. Apply mineral surfaced cap sheet, weather lap edges and ends, in a solid mopping of hot roofing asphalt applied at not less than 425 degree F at a rate of 25 lb of bitumen per square.

3.6 FLASHING AND STRIPPING INSTALLATION

- A. Install modified bituminous membrane base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing system manufacturer's written instructions and as follows:
 1. Backer Sheet Application: Install base-sheet backer and mechanically fasten to substrate. Adhere flashing backer sheet over roof membrane at wood cants in a uniform mopping of hot roofing asphalt.
 2. Base Flashing Application: Adhere modified bituminous membrane base flashing to substrate in a solid mopping of hot roofing asphalt applied to substrate and back of base flashing at not less than 425 degrees F at a rate of 25 lb of bitumen per square.
- B. Extend base flashing up the wall a minimum of 8 inches above roof membrane, and 6 inches onto field of roof membrane beyond cant.
- C. Mechanically fasten top of modified bituminous membrane base flashing securely at terminations and perimeter of roofing with termination bar system, or as otherwise shown in the Drawings.
- D. Install modified bituminous stripping where metal flanges and edgings are set on membrane roofing, according to roofing system manufacturer's written instructions.
- E. Roof Drains: Set 30-by-30-inch lead flashing in bed of asphalt roofing cement on completed built-up bituminous membrane roofing. Cover lead flashing with two plies of built-up bituminous stripping extending a minimum of 4 inches beyond edge of metal flashing onto field of roof membrane. Clamp roof membrane, metal flashing, and stripping into roof-drain clamping ring.

3.7 FIELD QUALITY CONTROL

- A. Roof Inspections: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation at start, during installation, and on completion, and submit report to Architect.
 1. Notify Architect and Owner 48 hours in advance of the date and time of inspections.

3.8 PROTECTING AND CLEANING

- A. Protect modified bituminous membrane roofing from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove modified bituminous roofing that does not comply with requirements, repair substrates, reinstall roofing, and repair base flashing to a condition free of damage and deterioration at the time of Substantial Completion and according to warranty requirements.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes flashing and sheet metal and trim including, but not limited to, the following:

1. Roof drainage systems.
2. Exposed trim, gravel stops, and fasciae.
3. Copings.
4. Metal flashing.
5. Reglets.
6. Flexible membrane flashing.

B. Related Sections:

1. Section 04 2113: Brick Masonry, for flashing associated with masonry work.
2. Section 04 2200: Concrete Unit Masonry, for flashing associated with masonry work.
3. Section 07 3113: Asphalt Shingles, for flashing associated with shingles.
4. Section 07 4646: Mineral-Fiber Cement Siding, for flashing associated with siding work.
5. Section 07 5100: Built-Up Bituminous Roofing, for flashing associated with roofing.
5. Section 07 5216: Modified Bituminous Membrane Roofing (SBS), for flashing associated with roofing.
6. Section 07 9200: Joint Sealants, for sealants.
7. Section 09 9000: Painting, for field painting.

1.2 PERFORMANCE REQUIREMENTS

A. Provide sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Show layouts of sheet metal and trim, including plans and elevations. Include the following:

1. Material, thickness, weight, and finish for each item and location in Project.
2. Details for forming, including profiles, shapes, seams, and dimensions.
3. Details for fastening, joining, supporting, and anchoring, including fasteners, clips, cleats, and attachments to adjoining work.

C. Samples: For each type of prefinished item with specified or selected color.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed work similar in material, design, and extent to that indicated for this Project.

B. Fabrication Standard: Comply with applicable recommendations of SMACNA's "Architectural Sheet Metal Manual."

1.5 PROJECT CONDITIONS

- A. Coordination: Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.
- B. Field Measurements: Field verify dimensions prior to fabrication.

1.6 WARRANTY

- A. Warrant Work of this Section to be watertight for 2 years following date of Substantial Completion.
 - 1. Warranty to cover repair of water leaks and resulting damage to building construction as may occur under normal usage within warranty period.
 - 2. Include in warranty replacement of damaged materials that cannot be adequately repaired, as determined by the Architect.

PART 2 PRODUCTS

2.1 SHEET METALS

- A. Prepainted, Metallic Coated Steel Sheet: Sheet steel metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755.
 - 1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653, G90 coating designation, structural quality.
 - 2. Aluminum-Zinc Alloy Coated Steel Sheet: ASTM A 792, Class AZ50 coating designation, Grade 40, structural quality
 - 3. Exposed Finish: Fluoropolymer 2-Coat thermocured system composed of inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2604.
 - a. Color and Gloss: As selected by Architect from manufacturer's full range of choices for color and gloss.
 - b. Resin Manufacturers:
 - 1) Ausimont USA, Inc. (Hylar 5000).
 - 2) Elf Atochem North America, Inc. (Kynar 500).
- B. Lead Sheet: ASTM B 749, Type L51121, copper-bearing lead sheet.
- C. Stainless-Steel Sheet: ASTM A 240, Type 304, soft annealed, with No. 2D (dull, cold rolled) finish.
- D. Aluminum Sheet: ASTM B 209, Alloy 3003, 3004, 3105, or 5005, Temper suitable for forming and structural performance required, but not less than H14, finished with high-performance fluoropolymer coating; not less than 0.0359 inch uncoated thickness, unless otherwise indicated.

2.2 UNDERLAYMENT MATERIALS

- A. Slip Sheet: Rosin-sized paper, minimum 5 lb./sq. ft.
- B. Felts: ASTM D 226, Type II (No. 30), asphalt saturated organic felt, nonperforated.
- C. Polyethylene Underlayment: ASTM D 4397, minimum 6 mil thick black polyethylene film.

2.3 FLEXIBLE MEMBRANE FLASHING

- A. Flexible Membrane Flashing: Composite, self-adhesive, flashing product consisting of a pliable, rubberized asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch.
- B. Acceptable Products: Subject to compliance with requirements provide one of the following products:
 - 1. Bakor; a Division of The Henry Company: 40 mil Blueskin SA; self-adhered, self-sealing, SBS rubberized asphalt sheet.
 - 2. Fortifiber Building Products Systems: FortiFlash Waterproof Flashing, 40 mil.
 - 3. W.R. Grace: Vycor V40 Weather Barrier Strips; self-adhered, self-sealing rubberized asphalt sheet.
- C. Primer: Product recommended by manufacturer of flexible flashing for substrate.
- D. Substitutions: Submit according to requirements of Section 01 2500.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and type of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners of non-corrosive metal designed to withstand design loads.
 - 1. Exposed Fasteners: Heads matching color of sheet metal by means of plastic caps or factory applied coating.
 - 2. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
- C. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
- D. Solder for Lead: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
- E. Burning Rod for Lead: Same composition as lead sheet.
- F. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing, permanently elastic, nonsag, nontoxic, and nonstaining.
- G. Elastomeric Sealant: ASTM 920, elastomeric silicone type specified in Section 07920 by Dow Corning, GE, or approved.
- H. Bituminous Coating: SSPC-Paint 12, cold-applied asphalt mastic, compounded for 15 mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
- I. Reglets: Type and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces and compatible with flashing indicated.
 - 1. Material: Stainless steel, unless otherwise indicated.
 - 2. Manufacturer: Fry Reglet Corporation, or approved.

- J. Roofing Cement: ASTM D 4586, Type I, asbestos free, asphalt based.

2.5 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of the item indicated.
- B. Comply with details shown and as required to fit substrates and result in waterproof and weather-resistant performance when installed.
 - 1. Fabricate in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
- C. Form exposed sheet metal Work in longest lengths practicable, without excessive oil canning, buckling, and tool marks, and true to line and levels indicated.
 - 1. Hem exposed edges, folded back minimum 1/2 inch.
 - 2. Angle bottom edges of vertical surfaces to form drip.
- D. Seams: Fabricate nonmoving seams from one of the following types. For non-aluminum materials, tin edges to be seamed, form seams, and solder.
 - 1. Standing Seams: 3/4 inch, double lock.
 - 2. Lap Seams: 3 inch finish width.
 - 3. Solder-Lap Seams: 1 inch finish width; sweat full with solder.
 - 4. S-Lock Seams: Form 1-1/4 inch wide 'S' shaped seam on one edge of flashing sheet for concealed fastening.
 - 5. Cover Plate Seams: Not allowed, unless specifically approved by Architect for application.
- E. Expansion Provisions: Form, fabricate and install sheet metal to provide for expansion and contraction in the finished Work.
 - 1. Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection.
 - 2. Where lapped or bayonet type expansion provisions cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant concealed within joints.
- F. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
- G. Conceal fasteners and expansion provisions where possible.
 - 1. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.
- H. Fabricate cleats and other attachment devices from same material and thickness as sheet metal component being anchored.

2.6 SHEET METAL FABRICATIONS

- A. Gutters with Girth up to 15 Inches: Prepainted Metallic-Coated Steel: 0.0239 inch uncoated thickness (24 gage).

- B. Gutters with Girth 16 to 20 Inches: Prepainted Metallic-Coated Steel: 0.0299 inch uncoated thickness (22 gage).
- C. Downspouts: Prepainted Metallic-Coated Steel: 0.0239 inch uncoated thickness (24 gage).
- D. Splash Pans: Stainless Steel: 0.019 inch thick (26 gage).
- E. Roof-Drain Flashing: Lead: 0.0625 inch thick (4.0 lb/sq. ft.), hard tempered.
- F. Copings: Prepainted Metallic-Coated Steel: 0.0299 inch uncoated thickness (22 gage).
- G. Base Flashing: Prepainted Metallic-Coated Steel: 0.0239 inch uncoated thickness (24 gage).
- H. Counterflashing: Prepainted Metallic-Coated Steel: 0.0239 inch uncoated thickness (24 gage).
- I. Drip Edges: Prepainted Metallic-Coated Steel: 0.0239 inch uncoated thickness (24 gage).
- J. Equipment Support Flashing: Prepainted Metallic-Coated Steel: 0.0299 inch uncoated thickness (22 gage).
- K. Roof Penetration Flashing: Lead: 0.0625 inch thick (4.0 lb/sq. ft.), hard tempered.

2.7 FINISH

- A. Provide prepainted, metallic coated steel sheet where indicated.
- B. Field apply paint finish as specified in Section 09 9000 for items not prepainted.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, securely anchored, and are ready to receive Work of this Section.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 2. Install Work in according to SMACNA recommendations and as indicated.
- B. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
 - 1. Conceal fasteners where possible.
 - 2. Install with exposed edges folded back to form hems.
- C. Install exposed sheet metal flashing and trim true to lines and levels indicated. Provide neat seams with minimum exposure of solder, welds, and sealant.
- D. Install sheet metal flashing and trim to result in watertight performance.

- E. Expansion Provisions:
1. Space movement joints at maximum 10 feet with no joints allowed within 24 inches of corner or intersection.
 2. Where lapped or bayonet type expansion provisions cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant concealed within joints.
- F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pretin edges of sheets to be soldered to a width of 1-1/2 inches, except where pretinned surface would show in finished Work.
1. Do not solder prepainted, metallic-coated steel sheet.
 2. Pretinning is not required for lead or lead-coated copper.
 3. Stainless Steel Soldering: Pretin edges using solder recommended for stainless steel and phosphoric acid flux. Promptly wash off acid flux residue from metal after soldering.
 4. Do not use open-flame torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
- G. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
1. Fill joint with sealant, minimum 1/4 inch diameter bead, and form metal to completely conceal sealant.
 2. Use joint adhesive for nonmoving joints specified not to be soldered.
- H. Seams: Fabricate nonmoving seams in sheet metal with specified seams. Tin edges to be seamed, form seams, and solder.
- I. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, and protect against galvanic action painting contact surfaces with bituminous mastic coating or by other permanent separation as recommended by fabricator of dissimilar metals.
1. Coat uncoated aluminum, stainless steel, and lead flashing and trim in contact with wood, ferrous metal, or cementitious construction.
 2. Underlayment: Install course of felt underlayment and cover with a slip sheet where metal flashing is installed directly on cementitious or wood substrates.
- J. Install reglets to receive counterflashing where shown or indicated.
- K. Counterflashings: Coordinate with installation of base flashing.
1. Lap-seam vertical joints a minimum of 4 inches and bed with sealant.
 2. Miter, lap-seam, and close corner joints with solder.
 3. Overlap base flashing 4 inches minimum.
 4. Install bottom edge spring-tight against base flashing.
 5. Provide where roof intersects vertical surfaces, and where indicated.
- L. Cleats:
1. Space cleats not more than 12 inches apart.
 2. Anchor cleats with 2 fasteners to prevent cleat rotation.
 3. Bend tabs over fastener head.

M. Copings:

1. Fabricate with standing seams spaced approximately 10 feet apart.
2. Miter corners.
3. Interlock exterior edge with continuous cleats anchored to substrate at 16 inch centers.
4. Anchor interior edge with screw fasteners and washers at 24 inch centers.
5. Slope top of coping toward roof.

N. Equipment Support Flashing:

1. Coordinate installation of equipment support flashing with installation of roofing and equipment.
2. Weld or seal flashing with sealant to equipment support member.

O. Roof-Penetration Flashing:

1. Turn lead flashing down inside piping, being careful not to block piping with flashing.
2. Seal and clamp flashing to pipes penetrating roof, other than lead flashing on vent piping.
3. Counterflash with preformed cover as detailed.

P. Flexible Membrane Flashing:

1. Install flexible membrane flashing at window and door openings and where shown or indicated to comply with manufacturer's written instructions.
2. Prime substrates as recommended by flashing manufacturer.
3. Lap seams and junctures with other materials at least 4 inches, except that at flashing flanges of other construction, laps need not exceed flange width.
4. Lap flashing over weather resistive building paper at bottom and sides of openings.
5. Lap weather resistive building paper over flexible flashing at heads of openings.
6. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

3.3 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
1. Neutralize flux as work progresses with 5 percent to 10 percent washing soda solution, and thoroughly rinse.
- C. Clean finished surfaces of completed installation. Maintain in a clean condition during construction.
- D. Replace sheet metal flashing and trim damaged or that has deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes elastomeric joint sealants for building applications shown or indicated, and as required to establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Related Sections:
 - 1. Section 07 8443: Fire-Resistant Joint Firestopping, for fire-resistant sealant used in firestopping assemblies.
 - 2. Section 08 8000: Glazing, for glazing sealant.
 - 3. Section 09 2900: Gypsum Board, for installation of acoustical sealant used in sound control gypsum board partitions.
 - 4. Section 09 8110: Acoustic Insulation and Sealant, for acoustical sealants.
 - 5. Section 32 1373: Concrete Paving Joint Sealants, for sealing joints in pavements, walkways, and curbing, not related to buildings.

1.2 SUBMITTALS

- A. Product Data for each joint sealant product indicated, including manufacturer's recommended installation procedures.
- B. Samples: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
 - 1. Upon request of Architect, submit physical samples of each sealant, backing material, primer, and bond breaker proposed for use.
- C. Warranties: Copies of special installers and manufacturers warranties.
- D. SWRI Validation: Evidence that each exterior elastomeric sealant has been validated by the Sealant Weatherproofing Restoration Institute's (SWRI) Sealant Validation Program.
- E. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
 - 1. Joint substrates and sealant backings have been tested for compatibility and adhesion with joint materials.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- F. Field Test Report Log: For each exterior elastomeric sealant application.

1.3 QUALITY ASSURANCE

- A. Applicator Qualifications: Use workers trained and experienced in necessary crafts and familiar with requirements and methods needed for proper performance of Work of this Section.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- C. Quality Standard: Sealant, Waterproofing and Restoration Institute (SWRI) requirements for materials and installation.

- D. Preconstruction Compatibility and Adhesion Testing: Submit to joint sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
 - 1. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - 2. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - 3. For materials failing tests, obtain joint sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
 - 4. Testing will not be required if joint sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates.
- E. Provide products that have been tested according to SWRI's Sealant Validation Program for compliance with requirements specified within a 36 month period preceding commencement of the Work.
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Section 01 3100.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to job site in their manufacturer's original containers, with labels intact and legible, and maintain intact until time of use.
- B. Do not retain material that has exceeded shelf life recommended by manufacturer.

1.5 ENVIRONMENTAL CONDITIONS

- A. Do not install sealant when joint substrates are wet, or ambient and substrate temperature conditions are outside limits recommended by manufacturer.

1.6 WARRANTY

- A. Special Installer's Warranty: Provide warranty in which installer agrees to repair or replace elastomeric joint sealants that do not comply with performance requirements specified in this Section, including joint sealant failure to provide air and watertight seal, loss of adhesion or cohesion, or failure to cure.
 - 1. Duration of warranties from date of Substantial Completion: 5 years.
- B. Special Manufacturer's Warranty: Provide warranties in which manufacturer agrees to repair or replace elastomeric joint sealants that do not comply with performance requirements specified in this Section, including joint sealant failure to provide air and watertight seal, loss of adhesion or cohesion, or failure to cure.
 - 1. Duration of warranties from date of Substantial Completion:
 - a. 20 years for exterior use Silicones.
 - b. 20 year non-stain warranty for exterior sealants.**
 - c. 5 years for Polyurethane sealants.

PART 2 PRODUCTS

2.1 MATERIALS - GENERAL

- A. **Compatibility:** Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. **Stain Characteristics:** Provide elastomeric joint sealant products that are nonstaining to porous substrates and have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- C. **Colors:** As selected from manufacturer's full range of standard colors.
 - 1. In exposed installation, use color of approximate color of adjacent surfaces, unless otherwise approved.
 - 2. In concealed installation use standard gray or black sealant.

2.2 SEALANT MATERIALS

- A. **Silicone – Class 100/50 (Ultra Low Modulus):**
 - 1. Single-Component, nonsag, neutral curing, ASTM C 920, Type S, Grade NS, Use NT, Class 100/50 (Joint movement range 100 percent in extension and 50 percent in compression).
 - 2. Products: One of the following, or approved.
 - a. Dow Corning DC 790.
 - b. GE SilPruf LM SCS2700.
 - c. Pecora 890.
 - d. Tremco Spectrem 1.
- B. **Silicone - Class 50 (Low Modulus):**
 - 1. Single-Component, nonsag, neutral curing, ASTM C 920, Type S, Grade NS, Use NT, Class 50 (Joint movement range 50 percent in extension and 50 percent in compression).
 - 2. Products: One of the following, or approved.
 - a. Dow Corning DC 791.
 - b. GE SilPruf SCS2000.
 - c. Pecora 864.
 - d. Tremco Spectrem 3.
- C. **Polyurethane - Class 100/50 (Ultra Low Modulus):**
 - 1. Single-Component, nonsag, ASTM C 920, Type S, Grade NS, Use NT, Class 100/50 (Joint movement range 100 percent in extension and 50 percent in compression).
 - 2. Products: One of the following, or approved.
 - a. Tremco Vulkem 921.
 - b. Tremco Dymonic FC,
- D. **Polyurethane Sealant - Class 25 (Medium Modulus):**
 - 1. Single-Component, non-sag, ASTM C 920, Type S, Grade NS, Use NT, Class 25, (Joint movement range 25 percent in extension and 25 percent in compression).

2. Products: One of the following, or approved.
 - a. BASF Sonneborn Sonolastic NP1.
 - b. BASF Sonneborn Sonolastic TX1.
 - c. Pecora Dynatrol I-XL.
 - d. Tremco Dymonic.
 - e. Tremco Vulkem 116.

E. Latex Sealant:

1. Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
2. Products: One of the following, or approved.
 - a. BASF Sonneborn Sonolac.
 - b. Pecora AC-20+.
 - c. Tremflex 834.

F. Silicone Mildew-Resistant Sealant:

1. Single-Component; mildew-resistant, neutral curing, ASTM C 920, Type S, Grade NS, Class 25, Use NT related to exposure, Use related to joint substrates, G, A, and O; and complying with FDA Regulation No. 21 CFR 177.2600.
2. Products: One of the following, or approved.
 - a. Dow Corning DC 786.
 - b. GE Silicones Sanitary SCS1700.
 - c. Pecora 898.
 - d. Tremco Tremsil 200 (White, unless otherwise indicated).

G. Foam Air-Infiltration Sealant:

1. Product: Kwik Foam by DAP, or approved.

H. Preformed Foam Sealant:

1. Preformed, precompressed, open-cell foam sealant of high-density urethane foam, permanently elastic, mildew resistant, nonmigratory, nonstaining, with pressure sensitive adhesive backing, and compatible with joint substrates and other joint sealant; joint movement range 25 percent in extension and 25 percent in compression.
2. Products: One of the following, or approved.
 - a. Emseal Joint Systems, Ltd., Emseal 25V.
 - b. Sandell Manufacturing Co., Inc., Polyseal.

I. Acoustic Sealant: As Specified in Section 09 8110, Acoustic Insulation and Sealant.

2.2 BACKUP MATERIALS

- A. Use only those backup materials that are non-absorbent, non-staining, and specifically recommended by manufacturer for installation with type of sealant used.
- B. Sealant Backer Rod: Provide one of the following Type B backing rods (bicellular material with a surface skin) unless otherwise recommended by sealant manufacturer:
 1. Nomaco Inc.: "Sof Rod."
 2. BASF Sonneborn: "Soft Backer Rod."

- C. Bond Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer. Provide self-adhesive tape where applicable.

2.3 MISCELLANEOUS MATERIALS

- A. Primer: Use only those primers which have been tested for durability on surfaces to be sealed, and are specifically recommended by sealant manufacturer for adhesion of joint sealant substrates, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to sealant and backing material manufacturer, formulated to promote optimum adhesion of sealant with joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealant and surfaces adjacent to joints.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine joints to receive joint sealants for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface clean joints immediately before installing sealant complying with manufacturer's instructions, and the following:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of sealant, including dust, oil, grease, rust, lacquer, laitance, loose mortar, ice and frost.
- B. Concrete:
 - 1. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, or mechanical abrading; remove loose particles from cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
 - 2. Where surfaces have been treated, remove surface treatment by sandblasting or wire brushing.
 - 3. Remove laitance and mortar from masonry joint cavities
 - 4. Remove laitance and form-release agents from concrete.
- C. Metal surfaces:
 - 1. Scrape steel surfaces with metal or wire brush to remove mill scale and rust.
 - 2. Clean nonporous surfaces with chemical cleaner which leaves no residue to remove oil and grease, and protective coatings, wiping surfaces with clean rags.
- D. Prime joints substrates where recommended by sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience.
 - 1. Apply primer to comply with joint sealant manufacturer's written instructions.
 - 2. Confine primers to areas of joint sealant bond.

- E. Use masking tape where required to prevent contact of sealant with adjoining surfaces that would otherwise be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears.

3.3 INSTALLATION

- A. Install joint sealers in accordance with recommendations of ASTM C 1193, and manufacturer's recommended installation procedures, as applicable to materials, applications, and conditions indicated.
 - 1. Do not paint silicone sealants.
 - 2. Where painting of sealants is a concern, obtain approval of Architect prior to application where use of polyurethane sealants is allowed.
- B. Sealant Backings:
 - 1. Install material to uniform depth below sealant.
 - 2. Using tool, smoothly and uniformly place backup material to depth of approximately 1/2 joint width (1/4 inch to 1/2 inch), compressing backup material 25 percent to 50 percent and securing a positive fit.
 - 3. Do not leave gaps between ends of sealant backings.
 - 4. Do not stretch, twist, puncture, or tear sealant backings.
- C. Install bond breaker tape behind sealant where sealant backing is not used between sealant and back of joints.
- D. Install sealant by proven techniques at the same time backings are installed.
 - 1. Thoroughly fill joints to recommended depth with sealant in direct contact with joint substrates.
 - 2. Produce uniform, cross sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
 - 3. Prevent three-sided adhesion of sealant to substrates.
- E. Tool joints to profile shown in Drawings, or as indicated below if such profiles are not shown in Drawings.
 - 1. Provide uniformly smooth joints with slightly concave surface, flush at edges with adjacent surface, according to ASTM C 1193, unless otherwise indicated.
 - 2. Do not use tooling agent unless specifically recommended in writing by sealant manufacturer.
 - 3. Leave sealant surface neat and smooth.
- F. Install preformed foam sealant according to manufacturer's instructions, taking care not to pull or stretch material.

3.4 FIELD QUALITY CONTROL

- A. Field Adhesion Testing: Test completed joint-sealant adhesion to joint substrates as follows:
 - 1. Test joint sealant after sealant has cured (usually within 7 to 21 days).
 - 2. Perform 10 tests for the first 1000 feet of joint length for each type of sealant and joint substrate, and 1 test each 1000 feet of joint length thereafter.
 - 3. Test Method: Test according to Method A, Field-Applied Sealant Joint Hand Pull Tab in ASTM C 1193, Appendix X1.

4. Record results in a field-adhesion test log. Include the following:
 - a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively.
 - 1) Include data on pull distance used to test each type of product and joint substrate.
 - 2) Compare results to determine if adhesion passes sealant manufacturer's field adhesion hand-pull test criteria.
 - b. Whether sealants filled joint cavities and are free of voids.
 - c. Whether sealant dimensions and configurations comply with specified requirements.
5. Include in test log, dates when sealants were installed, names of installers, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
6. Repair sealants pulled from test areas by applying new sealants following same procedures used to originally seal joints.
 - a. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field Test Reports:

1. Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory.
2. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements.
3. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING, ADJUSTMENT AND PROTECTION

- A. Clean adjacent exposed surfaces free from sealant as installation progresses, using cleaning agent recommended by manufacturer of sealant used.
1. Repair damaged surfaces.

3.6 SEALANT SCHEDULE

A. Exterior Joints in Vertical Surfaces and Horizontal Nontraffic Surfaces:

1. Includes joints in concrete, metals, at perimeter of building exterior door and window frames, and at other openings and joints in exterior walls:
 - a. Silicone - Class 100/50 (Ultra Low Modulus), unless otherwise recommended by sealant manufacturer for specific application and approved by Architect.
 - b. Color: As selected by Architect.
2. Exterior Joints in Vertical Surfaces in Wood and where painting of sealant is allowed by approval of Architect:
 - a. Polyurethane Sealant - Class 25 (Medium Modulus).

- B. Interior Joints in Vertical Surfaces and Horizontal Nontraffic Surfaces:
 - 1. At building interiors except at perimeter of steel and aluminum storefront, door, and window frames in exterior walls:
 - a. One of the Following Types:
 - 1) Latex.
 - 2) Polyurethane Sealant - Class 25 (Medium Modulus).
 - b. Color: As selected by Architect.
 - 2. At building interiors at perimeter of steel and aluminum, door, and window frames in exterior walls:
 - a. Polyurethane Sealant – Class 100/50 (Ultra Low Modulus).
 - b. Color: As selected by Architect.
- C. At Exterior Pavement Joints not Related to Buildings: Traffic-Grade Sealant specified in Section 32 1373.
- D. Around electrical boxes, between framing and openings at other locations where insulation in exterior walls is interrupted: Foam Air-infiltration Sealant.
- E. At Toilet Fixture Joints: Silicone mildew-resistant sealant.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes the following fabricated according to ANSI/SDI A250.8:
 - 1. Standard hollow metal steel doors.
 - 2. Standard hollow metal welded steel frames.
- B. Related Sections:
 - 1. Section 08 1400: Wood Doors, for doors in hollow metal frames.
 - 2. Section 08 7100: Door Hardware
 - 3. Section 08 8000: Glazing, for glass in hollow metal doors and frames.
 - 4. Section 09 9000: Painting, for painting of hollow metal doors and frames.

1.2 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, core descriptions, label compliance, fire-resistance and temperature-rise ratings, and finishes for each type of hollow metal door and frame specified.
- B. Shop Drawings showing fabrication and installation of each type of hollow metal door and frame, elevations of door designs, details of openings, dimensions, and anchorage.
- C. Door and Frame Schedule: Use same reference numbers for details and openings as those in Contract Drawings.
 - 1. Indicate coordination of glazing frames and stops with glass and glazing requirements.
- D. Submit evidence that doors, and door and frame assemblies, have been tested and approved by governing jurisdiction for the following labeled construction:
 - 1. Fire protection rating label for doors and frames.
 - 2. Smoke control "S" label for door and frame assemblies.
 - 3. Temperature rise label for doors.
- E. Certification: Submit certification that work of this Section complies with ANSI/SDI A250.8, or equivalent standards of HMMA 861 (Hollow Metal Manufacturers Association).

1.3 QUALITY ASSURANCE

- A. Use skilled workers trained and experienced in necessary crafts and familiar with requirements and methods needed for proper installation of work of this Section.
- B. Provide doors and welded frames from a single manufacturer, unless otherwise specifically approved by Architect.
- C. Minimum Quality Standards: Comply with latest edition of following standards of ANSI and the Steel Door Institute (SDI):
 - 1. ANSI/SDI A250.8, Recommended Specifications for Standard Steel Doors and Frames.
 - 2. SDI 105, Recommended Erection Instructions for Steel Frames.
 - 3. SDI 109, Hardware for Standard Steel Doors and Frames.
 - 4. SDI 112, Zinc-Coated Standard Steel Doors and Frames.

5. SDI 117, Manufacturing Tolerances Standard Steel Doors and Frames.
6. SDI 118, Basic Fire Door Requirements.

1.4 REGULATORY REQUIREMENTS

- A. Fire-Rated Hollow Metal Door and Frame Assemblies: Assemblies complying with NFPA 80 and tested according to NFPA 252 that are listed and labeled for fire protection indicated, and for smoke control with "S" label where indicated and required by current Building Code, when tested according to UL 1784 for smoke control door assemblies.
 1. Comply with Factory Mutual, Underwriters Laboratories, or Warnock Hersey requirements, and attach acceptance label permanently to each fire door and frame assembly.
- B. Safety Glass: Comply with ANSI Z97.1 and testing requirements of 16 CFR, Part 1201.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use nonvented plastic.
- B. Store in protected dry area, in a vertical position with heads up, on minimum 4 inch high wood blocking, spaced to permit air circulation.
- C. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

1.6 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames, and as required with other trades to assure proper and adequate provision in work of those trades for interface with work of this Section.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Hollow Metal Doors and Welded Frames:
 1. Acceptable Manufacturers: Subject to compliance with requirements, provide products by any manufacturer that can provide and certify to fabrication of products that meet or exceed requirements of ANSI, SDI (Steel Door Institute), or HMMA (Hollow Metal Manufacturers Association), and requirements of these specifications.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008, Commercial Steel (CS), Type B, suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653, Commercial Steel (CS), Type B; with minimum G60 zinc (galvanized) or A60 zinc-iron-alloy (galvannealed) metallic coating.

- D. Frame Anchors: ASTM A 591, Commercial Steel (CS), 40Z coating designation; mill phosphatized.
 - 1. Anchors Built Into Exterior Walls: Steel sheet complying with ASTM A 1008 or ASTM A 1011, hot-dip galvanized according to ASTM A 153, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanize according to ASTM A 153.
- F. Glass for Doors and Frames: As specified in Section 08 8000.
 - 1. Safety Glass: Provide products complying with ANSI Z97.1 and testing requirements of 16 CFR, Part 1201, for Category II materials.
 - 2. Glazing for Fire-Rated Doors: Glazing that complies with NFPA 80, for fire ratings indicated, based on testing according to NFPA 252 for door assemblies.

2.3 STANDARD HOLLOW METAL DOORS

- A. General: Provide hollow metal doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces, unless otherwise indicated. Comply with ANSI A250.8 for level and model and ANSI A250.4 for physical performance level.
- B. Interior Doors: Level 2 and Physical Performance Level B (Heavy Duty), Model 1, Full Flush Design.
 - 1. Material: Minimum 0.042 inch (18 gage) uncoated thickness, cold-rolled steel sheet.
 - 2. Core: Manufacturer's standard phenolic resin impregnated kraft paper honeycomb core bonded to both face skins.
- B. Exterior Doors: Level 2 and Physical Performance Level B (Heavy Duty), Model 1, Full Flush Design.
 - 1. Material: Minimum 0.042 inch (18 gage) uncoated thickness, cold-rolled, metallic coated sheet steel.
 - 2. Core: ASTM C 578 Type 1, Polystyrene or polyurethane foam bonded to both face skins with minimum U-value rating of 0.41.
- C. Thickness: 1-3/4 inches, unless otherwise indicated.
- D. Size: As required to fit frame opening indicated in Door Schedule.
- E. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- F. Fire-Resistance, Smoke Control, and Temperature Rise Rating: As indicated in Door Schedule.

2.4 STANDARD HOLLOW METAL WELDED FRAMES

- A. Provide hollow metal welded steel frames for doors, borrowed lights, and other openings according to ANSI A250.8 and with details indicated for type and profile.
- B. Fabricate frames with mitered or coped corners, full profile welded.
 - 1. Fabricate frames installed in drywall partitions with backbend return (double backbend).

- C. Interior Frames: Minimum 0.053 inch (16 gage) uncoated thickness cold-rolled steel sheet.
 - 1. Fabricate frames for interior openings 48 inches and wider from minimum 0.067 inch (14 gage) uncoated thickness cold-rolled steel sheet.
- D. Exterior Frames: Minimum 0.067 inch (14 gage) uncoated thickness metallic coated cold-rolled steel sheet.
- E. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as frames.
- F. Provide frames with steel spreader temporarily attached to the feet of both jambs to serve as a brace during shipping and handling.

2.5 FABRICATION

- A. General: Fabricate hollow metal door and frame units to be rigid, free of defects, warp, or buckle.
 - 1. Fabricate exposed faces of doors and panels from only cold-rolled steel sheet.
 - 2. Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and molding from either cold or hot-rolled steel sheet.
 - 3. Close top and bottom of doors flush, except where approved by Architect for an inverted U channel to accommodate specified hardware.
 - 4. Bevel lock and hinge side edges of doors 1/8 inch in 2 inches.
- B. Exterior Doors:
 - 1. Provide weep hole openings in bottom of exterior doors to permit moisture to escape.
 - 2. Seal joints in top edges of doors against water penetration.
- C. Welded Frames:
 - 1. Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 - 2. Exposed Fasteners: Provide countersunk flat or oval heads for exposed screws and bolts.
 - 3. Plaster Guards: Weld guards to frame at back of hardware mortises in frames installed in concrete or masonry.
 - 4. Sidelight Frames: Provide closed tubular members with no visible face seams or joints; fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
 - 5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 - 6. Jamb Anchors: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c.
 - a. Stud-Wall Type:
 - 1) Three anchors per jamb up to 60 inches high.
 - 2) Four anchors per jamb from 60 to 90 inches high.
 - 3) Five anchors per jamb from 90 to 96 inches high.
 - 4) Two anchors per head for frames above 42 inches wide and mounted in metal-stud partitions
 - b. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c

7. Door Silencers: Except on frames to receive weatherstripping or gasketing, drill stops to receive 3 silencers on strike jambs of single leaf door openings, and 2 silencers on heads of double leaf door openings.
- D. Clearances: Fabricate with following clearances, except for fire doors provide clearances according to NFPA 80.
1. Between doors and frames: 1/8 inch.
 2. Between door bottoms and thresholds: 1/4 inch.
 3. Between door bottoms and floor: 3/4 inch.
 4. Between meeting edges of non-fire rated pairs of doors: 3/32 inch
- E. Tolerances: Comply with SDI 117.
- F. Fabricate galvanized steel doors and frames according to SDI 112.
- G. Hardware Preparation: Factory prepare doors and frames to receive hardware according to final door hardware schedule and templates provided by hardware supplier.
1. Comply with requirements of ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
 2. Provide space, cutouts, reinforcing for concealed overhead door closers and provisions for fastening in top rail of doors or head of frames, as applicable.
 3. Locate hardware as indicated on Shop Drawings, or, if not indicated, according to ANSI/SDI A250.8.

2.6 STOPS AND MOLDINGS

- A. Moldings for Glazed Lights in Doors: Provide minimum 0.042 inch (18 gage) uncoated thickness steel fabricated from same material as door face sheet. Form corners with butted or mitered hairline joints.
- B. Fixed Frame Moldings: Formed integral with steel frames, minimum 5/8 inch high, unless otherwise indicated.
1. Locate on inside of exterior frames and on secure side of interior frames for glass and louvers.
- C. Loose Glazing Stops in Frames: Channel shaped cold-rolled steel, butted at corner joints and secured to the frame using countersink oval head machine screws, spaced 9 inches o.c. maximum.
1. Provide square profile, unless otherwise indicated.
 2. Steel Thickness:
 - a. Exterior: Minimum 0.053 inch (16 gage) uncoated thickness.
 - b. Interior: Minimum 0.042 inch (18 gage) uncoated thickness

2.7 FINISHES

- A. Preparation: Clean surfaces and apply pretreatment of conversion coating of type suited to organic finish coating.

- B. Hollow Metal Steel Doors and Welded Steel Frames: Factory Prime for Field-Painted Finish:
 - 1. Apply manufacturer's standard rust inhibitive shop primer complying with ANSI/SDI A250.10 immediately after surface and pretreatment that is compatible with finish paint systems specified in Section 09 9000 and suited to substrate.
- C. Factory Primed Hollow Metal Steel Doors and Frames: Field apply finish coats of paint as specified in Section 09 9000.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions under which work of this Section will be performed.
 - 1. Correct conditions detrimental to timely and proper completion of Work.
 - 2. Do not proceed until unsatisfactory conditions are corrected.
- B. Verify flexible membrane flashing has been installed at all exterior door wall openings as specified and installed under provisions of Section 07 6000.

3.2 INSTALLATION

- A. Install hollow metal doors and frames plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings, requirements of governmental agencies having jurisdiction, and manufacturer's and referenced standard's recommended installation procedures.
- B. Placing Frames: Comply ANSI/SDI 250.11, and the following:
 - 1. Where possible, place frames prior to construction of enclosing walls.
 - 2. Set frames accurately into position, aligned and braced securely until permanent anchors are set.
 - a. Frames in final position to be plus or minus 1/16 inch maximum from squared and plumbed alignment.
 - 3. After frames have been installed and wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
 - 4. At in-place construction, set frames and secure to adjacent construction with machine screws and suitable anchorage devices. Provide "Z" fillers at each screw location.
 - 5. Provide sealant between frame and adjacent wall material.
 - 6. Install fire-rated frames according to NFPA 80.
- C. Installing Doors:
 - 1. Set doors flush with frame face and plumb to hold in any position.
 - 2. Fit doors accurately in frames within specified clearances.
 - 3. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
 - 4. Install smoke control doors according to NFPA 105 with frames that have been constructed and tested as an assembly in accordance with UL 1784 and approved for "S" label.

3.3 CLEANING, ADJUSTMENT AND PROTECTION

- A. Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including standard steel doors or frames that are warped, bowed, or otherwise unacceptable.
 - 1. During warranty period, check and adjust operating finish hardware items for smooth and quiet operation.
- B. Immediately after erection, sand smooth rusted and damaged areas of prime coat, and apply touch up of compatible, air-drying primer.
- C. Clean exposed surfaces of Work of this Section and repair as required.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior solid core flush wood swing doors.

B. Related Sections:

1. Section 08 1113: Standard Hollow Metal Doors and Frames, for door frames.
2. Section 08 7100: Door Hardware.
3. Section 09 9000: Painting, for finishes.

1.2 SUBMITTALS

A. Product Data: For each type of door. Include details of core and edge construction, trim for openings, fire-resistance and temperature-rise ratings, and factory finishing specifications.

B. Shop Drawings: Show elevations of each kind of door, location and extent of hardware blocking, and details of door construction not included in Product Data.

C. Door Schedule: Use same reference numbers for details and openings as those in Contract Drawings.

1. Indicate doors to be factory finished and other finish requirements.
2. Indicate locations and dimensions of cutouts.

D. Samples: Approximately 8 by 8 inches in size, of each door face material with each type of specified finish.

1.3 QUALITY ASSURANCE

A. Quality Standards: Comply with the following:

1. Architectural Woodwork Institute (AWI) "Architectural Woodwork Quality Standards Illustrated."

B. Source Limitations: Obtain each type of door through one source from a single manufacturer.

1.4 REGULATORY REQUIREMENTS

A. Safety Glass: Comply with ANSI Z97.1 and testing requirements of 16 CFR, Part 1201.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect doors during transit, storage, and handling to prevent damage, soiling, and deterioration.

1. Comply with requirements of referenced standard and manufacturer's instructions.
2. Deliver doors individually packaged in plastic bags or cardboard cartons.
3. Deliver doors clearly marked with manufacturer's name, size, and thickness.
4. Mark each door on top and bottom rail with opening number used in Shop Drawings.
5. Immediately open, but don't remove, wrap at Project site to ventilate.

B. Handling: Do not drag doors across one another; lift doors and carry them into position.

1.6 PROJECT CONDITIONS

- A. Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 degrees F and relative humidity between 25 and 55 percent during the remainder of construction period.

1.7 COORDINATION

- A. Coordinate with or trades as required to assure proper and adequate provision in work of those trades for interface with work of this Section.
 - 1. Coordinate fabrication of doors to receive hardware specified in Section 08 7100.

1.8 WARRANTY

- A. Special Warranty: Signed by manufacturer, installer, and Contractor, in which manufacturer agrees to repair or replace doors that are defective in materials and workmanship, and do not meet specified fabrication tolerances.
 - 1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 2. Warranty shall be in effect during the following period of time from date of Substantial Completion.
 - a. Interior Solid Core Doors: Life of installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Flush Wood Doors: Subject to compliance with requirements, provide products of one of the following:
 - 1. Algoma Hardwoods Inc.
 - 2. Ampco
 - 3. BJ Doors.
 - 4. Cenco.
 - 5. Eggers Industries.
 - 6. Graham.
 - 7. Lynden Door, Inc.
 - 8. Marshfield Door Systems, Inc.
 - 9. Vancouver Door Company, Inc.
 - 10. VT Industries.
 - 11. Western Oregon Door.

2.2 FLUSH DOORS

- A. Interior Solid Core Doors:
 - 1. Types: Flush face.
 - 2. Construction: PC-5 or PC-7.
 - 3. Sizes and Relites: See Door Schedule.
 - 4. Thickness: 1-3/4 inches.
 - 5. Core: Particleboard; ANSI A208-1 Grade 1, LD-2.
 - 6. Side Stiles: 1-3/8 inch minimum width.
 - 7. Finish: Transparent, as scheduled.

B. Doors for Transparent Finish:

1. Face Veneer Species: Birch (natural) rotary cut.
2. AWI Grade: Custom, with AWI Veneer Grade A face sheets.
3. Veneer Thickness: Minimum 1/50th inch at 12 percent moisture content.
4. Veneers: Face: Book match.
5. Assembly: Running match.
6. Edge Bands:
 - a. Side Stiles: 1-3/8 inch minimum width hardwood stiles, matching face veneer color for doors with transparent finish.

C. Glass: As specified in Section 08 8000.

1. Safety Glass: Provide products complying with ANSI Z97.1 and testing requirements of 16 CFR, Part 1201, for Category II materials.

2.3 FABRICATION

A. Comply with the following AWI Quality Standards:

1. AWI Section 1300 for Architectural Flush Doors.

B. Bond door faces to cores, stiles and rails with adhesive. Bond edge banding to core.

C. Blocking: Provide wood blocking in particleboard core doors as indicated to eliminate through-bolting hardware for hardware items listed below. Provide composite blocking with improved screw-holding capability approved for fire-rated doors.

1. Closers: 5 inch top rail blocking.
2. Kick, Mop, or Armor Plates: 5 inch bottom rail blocking.
3. Exit Devices: 5 inch midrail blocking.

D. Machine and hand sand exposed surfaces.

E. Light Openings:

1. Provide wood frames for light openings same species as door faces with recessed tapered beads.

F. Factory fit doors to suit frame opening sizes indicated with uniform clearances and bevels per requirements of referenced quality standard.

1. Comply with requirements of NFPA 80 and UL 1784 for fire-rated and smoke control doors.

G. Factory machine doors for hardware that is not surface applied.

2.4 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference between 2 diagonal measurements.

B. Maximum warp: 1/4 inch space measured from horizontal, vertical, or diagonal straight edge to point of maximum bow, cup, or twist.

C. Maximum stile, rail and core telegraphing show-through at door face: 0.01 inch in any 3 inch span.

2.5 FACTORY FINISHING

- A. Factory finish doors that are indicated to receive transparent finish.
 - 1. Comply with AWI Quality Standards of Section 1500 for finishing.
- B. Transparent Finish:
 - 1. Grade: Premium.
 - 2. AWI Finish System: Post-Catalyzed Lacquer.
 - 3. Staining: None required.
 - a. Open Finish for Open-Grain Woods: Do not apply filler to open-grained woods.
 - 4. Sheen: Satin 30-50 gloss units.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine installed door frames before hanging doors.
 - 1. Verify that frames comply with specified requirements for type, size, location, and swing, and have been installed plumb and level.
 - 2. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Hardware: Installed under provisions of Section 08 7100.
- B. Install wood doors in accordance with manufacturer's instructions and referenced quality standard.
- C. Factory Fitted Doors: Align in frame for uniform clearance at each edge.
- D. Fitting and machining:
 - 1. Tolerances:
 - a. Bottom: 1/4 inch clearance maximum.
 - b. Top: 1/8 inch clearance maximum.
 - c. Lock edge and hinge edge: Bevel 1/8 inch in 2 inches maximum.
 - 2. Machine doors for hardware in accordance with recommendations of hardware Manufacturers.

3.3 COMPLIANCE

- A. Owner may employ a representative of reference organization to inspect and determine that Work of this Section has been performed in accordance with specified standards.

3.4 ADJUSTING

- A. During warranty period, check, adjust and service moving parts to operate smoothly and quietly.
 - 1. Adjust as necessary weatherstripping, gaskets, and door bottoms for correct clearance.
 - 2. Rehang or replace doors that do not swing or operate freely.
- B. Replace doors that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and show no evidence of repair or refinishing.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes aluminum entrances and storefronts.
- B. Related Sections:
 - 1. Section 07 9200: Joint Sealants.
 - 2. Section 08 7100: Door Hardware.
 - 3. Section 08 8000: Glazing.

1.2 PERFORMANCE REQUIREMENTS

- A. Provide entrance and storefront system capable of withstanding loads and thermal and structural movement requirements indicated without failure, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Air Infiltration: ASTM E 283 not to exceed 0.06 CFM at a static air pressure differential of 6.24 PSF.
- C. Water Infiltration: ASTM E 331, no water penetration at test pressure of 8 PSF.
- D. Maximum Deflection: ASTM E 330, no deflection in excess of 1/175 of span.
- E. Allowable Stress Factor of Safety: 1.65.

1.3 SUBMITTALS

- A. Product Data: For each product specified; include details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- B. Shop Drawings in sufficient detail to show dimensions, fabrication, installation, anchorage, and interface of work of this Section with work of adjacent trades.
- C. Manufacturer's recommended installation procedures.
- D. Samples: For each exposed member illustrating finish, color, texture and sheen.

1.4 QUALITY ASSURANCE

- A. Use skilled Workers who are trained and experienced in crafts and familiar with requirements and methods needed for proper performance of work of this Section.
- B. Installer to be approved by manufacturer.
- C. Product Options: Sizes, profiles, and dimensional requirements indicated are based on specific systems indicated. Other manufacturers' systems with equal performance characteristics may be considered. Refer to requirements of Section 01 2500 for substitutions.

1.5 REGULATORY REQUIREMENTS

- A. Design entrance and storefront system to withstand wind loads and seismic loads according to provisions of Chapter 16 of State of Oregon Structural Specialty Code based on International Building Code.

- B. Doors to comply with accessibility guidelines of The Americans with Disabilities Act (ADA) and accessibility requirements of State Building Code.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store above ground, under cover and protected from damage.

1.7 FIELD MEASUREMENTS

- A. Field verify dimensions prior to fabrication; if vary significantly from Contract Documents, obtain architect's approval before proceeding.

1.8 WARRANTY

- A. Provide warranty agreeing to replace work of this Section that fails due to defective materials or installation to be weathertight within 2 years after Date of Substantial Completion.
- B. Failure due to defective materials or Workmanship is deemed to include, but not to be limited to:
 - 1. Structural failures including, but not limited to, excessive deflection.
 - 2. Noise or vibration caused by thermal movements.
 - 3. Deterioration of metal, metal finishes, and other materials beyond normal weathering.
 - 4. Adhesive or cohesive sealant failures.
 - 5. Water leakage through fixed glazing and framing areas.
 - 6. Failure of operating components to function properly.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: The design for glazed aluminum storefront system is based on the following:
 - 1. Kawneer.
- B. Subject to compliance with requirements, other acceptable manufacturers with comparable products are the following:
 - 1. Arcadia.
 - 2. EFCO Corporation.
 - 3. United States Aluminum.
 - 4. Traco.
 - 5. Vistawall Architectural Products.

2.2 COMPONENTS

- A. Storefront Framing Components:
 - 1. Center and offset as detailed.
 - 2. Framing System: Kawneer Trifab VG, 451T.
 - 3. Nominal Size: 2 inches by 4-1/2 inches.
 - 4. Aluminum Extrusions: ASTM B 221, 6063T5 aluminum alloy.
 - 5. Fasteners: ASTM B 633, Aluminum, stainless steel, and zinc plated steel.
- B. Doors:
 - 1. Door System: Kawneer Medium Style 350.

2. Nominal Stile Size: 1-3/4 by 3-1/2 inches.
3. Door Height: See Door Schedule.
4. Minimum Bottom Rail Height: 10 inches.
5. Swing: Single acting.

C. Closures, Trim and Filler Panels:

1. Aluminum Sheet: ASTM B 209, alloy and temper as recommended by aluminum producer and finisher for type of use and finish indicated.
2. Thickness: 0 063 inch.
3. Finish: Match storefront and window system finish.

D. Spandrel Panels: Aluminum, flat panels with no deviation in plane exceeding 0.8 percent of panel dimension in width or length.

1. Panel Thickness: 1/8 inch, unless otherwise indicated.
2. Finish: Match window system finish.

E. Brackets and Reinforcements:

1. Provide manufacturer's standard brackets and reinforcements that are compatible with adjacent materials.
2. Provide nonstaining, nonferrous shims for aligning system components.

F. Fasteners and Accessories:

1. Manufacturer's standard corrosion resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

G. Sealant:

1. Glazing Sealant: Manufacturer's standard.
2. Framing Sealant: Silicone sealant as specified in Section 07 9200, or otherwise recommended by sealant and entrance and storefront system manufacturer to suit conditions.
 - a. Color: As selected from manufacturer's full range of colors.

H. Flashing:

1. Material: 0.050 inch thick minimum prefinished aluminum, with smooth texture.
2. Finish: To match storefront.

2.3 HARDWARE

A. Provide heavy duty hardware units required and recommended by manufacturer for entrances indicated.

1. Finish exposed parts to match door finish.

B. Provide complete hardware items required for entrance doors not otherwise specified in Section 08 7100, including the following:

1. Offset Pivots: ANSI/BHMA A 156.4, Grade 1.
 - a. For doors with heights up to 87 inches, provide 3 hinges per leaf.

2. Closers: Manufacturer's recommended size depending of door size, exposure to weather, and anticipated frequency of use.
 - a. Comply with requirements for ADA and local code requirements for disabled accessibility.
 - b. Standard: BHMA A 156.4, Grade 1.
3. Cylinders: As specified in Section 08 7100.
4. Panic Exit Devices: Listed and labeled, based on testing according to UL 305; BHMA A156.3, Grade 1.
5. Thresholds: Manufacturer's standard aluminum threshold with cutouts coordinated for operating hardware, not more than 1/2 inch high, with beveled edges providing a floor level change with a slope of not more than 1:2.
6. Weather Stripping Manufacturer's standard replaceable components; compression type made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
7. Weather Sweeps: Manufacturer's standard for application to exterior door bottoms with concealed fasteners on mounting strips.

2.4 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation.

2.5 FABRICATION

- A. Fabricate to profiles indicated.
- B. Provide subframes and reinforcing of types indicated or required for a complete system.
- C. Provide hairline fit at joints, securely fastened, with smooth continuity of line and accurate relation of planes and angles.
- D. Perform fitting of finish hardware to doors and frames at factory, but do not drill or tap for surface mounted items until time of installation at site.
 1. Use concealed fasteners to maximum extent practicable.
- E. Closures, Trim and Filler Panels: Form metal to profiles indicated, in maximum lengths to minimize joints.
 1. Produce flat, flush surfaces without cracking or grain separation at bends.
 2. Fold back exposed edges of unsupported sheet metal to form a 1/2 inch wide hem on the concealed side, or ease edges to a radius of approximately 1/32 inch and support with concealed stiffeners

2.6 ALUMINUM FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes to exposed aluminum surfaces.
- B. Class I, Color Anodic Finish: AA-M12C22A42/A44 (Architectural Class I, integrally colored coating 0.018 mm or thicker) complying with AAMA 611.
 1. Color: Dark bronze.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions under which work of this Section will be performed.
 - 1. Correct conditions detrimental to timely and proper completion of Work.

3.2 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in work of those trades for interface with work of this Section.

3.3 INSTALLATION

- A. Comply with manufacturer's written instructions for protecting, handling, and installing entrance and storefront systems.
 - 1. Do not install damaged components.
 - 2. Fit frame joints to produce hairline joints free of burrs and distortion.
 - 3. Rigidly secure nonmovement joints.
 - 4. Seal joints watertight.
- B. Provide protection against electrolysis occurring between different adjacent metals as required.
- C. Set door thresholds in full bed of sealant.
- D. Remove protective coating completely from exposed surfaces as soon as progress of work shall permit with safety.
- E. Install glazing to comply with requirements of Section 08 8000.
 - 1. When glazing is performed under this Section, provide types of glass required and glaze in accordance with storefront/doors/windows manufacturer's standards.
- F. Install aluminum panels same as glass, incorporated into glazing system of storefront.
- G. Install sealant to comply with requirements of Section 07 9200.

3.4 CLEANING, ADJUSTMENT AND PROTECTION

- A. During warranty period, adjust and service moving parts of doors to operate smoothly and quietly.
- B. Clean exposed surfaces, including surfaces affected by work of this Section, and repair as required.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes fiberglass windows with wood veneer interior cladding.
- B. Related Sections:
 - 1. Section 07 6000: Flashing and Sheet Metal, for flexible membrane flashing at window openings.
 - 2. Section 07 9200: Joint Sealants, for perimeter sealant at windows.

1.2 DEFINITIONS

- A. The following are based on AAMA/NWWDA for defining Performance Class:
 - 1. AW: Architectural.
 - 2. HC: Heavy Commercial.
 - 3. C: Commercial.
 - 4. LC: Light Commercial.
 - 5. R: Residential.

1.3 PERFORMANCE REQUIREMENTS

- A. AAMA/NWWDA Performance Requirements: Provide windows of the performance class and grade indicated that comply with AAMA/NWWDA 101/I.S.2.
 - 1. Performance Class: C.
 - 2. Performance Grade: 40.
 - 3. Exception to AAMA/NWWDA 101/I.S.2: In addition to requirements for performance class and performance grade, design glass framing system to limit lateral deflections of glass edges to less than 1/175 of glass-edge length or 3/4 inch, whichever is less, at design pressure based on the following:
 - a. Testing performed according to AAMA/NWWDA 101/I.S.2, Uniform Load Deflection Test or structural computations.
- B. Structural Performance: Design and size members to withstand dead loads and live loads caused by pressure and suction of wind as calculated in accordance with State Building Code to a design pressure of 40 lb/sq ft and a suction of -20 lb/sq ft as measured in accordance with ASTM E 330.
 - 1. Limit mullion deflection to 1/200, or flexure limit of glass with full recovery of glazing materials, whichever is less.
- C. Air Infiltration: Maximum CFM per square foot of overall sash crack at inward test pressure of 1.57 when tested in accordance with ASTM E 283.
 - 1. Fixed Windows: 0.01.
- D. Water Penetration: No water penetration at inward test pressure of 4.50 psf when tested in accordance with ASTM E 547.
- E. Provide window assemblies with overall U-value of 0.38 or less.
- F. Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to exterior.

1.4 SUBMITTALS

- A. Product Data: For each product specified in this Section.
- B. Shop Drawings in sufficient detail to show elevations, dimensions, installation clearances, anchorage and interface of work of this Section with work of adjacent trades.
- C. Manufacturer's recommended installation procedures.
- D. Manufacturer's operating/maintenance instructions.
- E. Manufacturer's certification that windows provided are in compliance with performance standards specified.

1.5 QUALITY ASSURANCE

- A. Use skilled workers trained and experienced in necessary crafts and familiar with requirements and methods needed for proper performance of work of this Section.

1.6 CERTIFICATION

- A. Provide certificates listing AAMA tests affirming that windows meet, and comply, with performance standards specified.

1.7 REGULATORY REQUIREMENTS

- A. Design windows to withstand wind loads according to provisions of State Building Code.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver with each unit bearing NFRC and AAMA labels certifying compliance.
- B. Store above ground, under cover and protected from damage.

1.9 FIELD MEASUREMENTS

- A. Field verify dimensions prior to fabrication.

1.10 WARRANTY

- A. Provide manufacturer's standard commercial 10 year warranty for fiberglass windows.
 - 1. Replace, rehang and refinish without additional cost to Owner failures due which include, but not limited to, the following:
 - a. Failures in operation of operating component or components.
 - b. Water leakage or air infiltration in excess of specified standard.
 - c. Deterioration of finish to an extent visible to unaided eye.
 - d. Defects which contribute to unsightly appearance, potential safety hazard, or potential untimely failure of Work of this Section or Work as a whole.
- B. Warrant insulating glass for 10 years against leakage at seals.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products of the following:

1. Milgard Manufacturing, Inc.: Milgard WoodClad.
2. Marvin Windows and Doors: Integrity

B. Substitutions: Submit in accordance with requirements or Section 01 2500.

2.2 MANUFACTURED UNITS

A. Fiberglass Window Types:

1. Fixed.

2.3 MATERIALS

A. Frame:

1. Materials:

- a. Fiberglass: AAMA 305 glass fiber reinforced thermoset profile.
- b. Wood Veneer: Clear vertical grain Douglas Fir, 0.20 inches thick with fleece backing.

2. Profile: Manufacturer's standard, with nailing flanges.
3. Shape and size: As shown.
4. Color:

- a. Exterior: Color as selected by Architect from manufacturer's standard colors.
- b. Interior: Wood veneer; transparent finish.

B. Glass:

1. Glass Type GL-1: 7/8-inch thick insulating, clear float, complying with ASTM E 774, and provisions specified in Section 08 8000.

a. Low 'E'.

2. Provide tempered where shown or required by State Building Code.

C. Weatherstripping: EPDM.

D. Glazing stops: Matching screw-applied or snap-on.

E. Flashing at Wall Openings: Flexible membrane flashing specified and installed under provisions of Section 07 6000.

2.4 FABRICATION

A. Mitered and mechanically joined corners; trim and finish corners to match adjacent surfaces.

B. Provide replaceable weatherstripping.

C. Drainage: Exterior weep holes.

- D. Reglazing: Permitted without disassembly of sash frame.

2.5 ALLOWABLE TOLERANCES

- A. Dimensions 6 ft. or less: 1/16 inch \pm .
- B. Dimensions over 6 ft.: 1/8 inch \pm .

2.6 FACTORY FINISHING

- A. Factory finish wood veneer indicated to receive transparent finish.
 - 1. Comply with AWI Quality Standards of Section 1500 for finishing.
- B. Transparent Finish:
 - 1. Grade: Premium.
 - 2. AWI Finish System: Post-Catalyzed Lacquer.
 - 3. Staining: Match approved sample for color.
 - a. Wash Coat for Stained Finish: Apply a vinyl washcoat to woodwork made from closed-grain wood before staining and finishing.
 - b. Open Finish for Open-Grain Woods: Do not apply filler to open-grained woods.
 - 4. Sheen: Satin 30-50 gloss units.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions under which work of this Section will be performed.
 - 1. Correct conditions detrimental to timely and proper completion of Work.
 - 2. Do not proceed until unsatisfactory conditions are corrected.
- B. Verify flexible membrane flashing has been installed at all window wall openings as specified and installed under provisions of Section 07 6000.

3.2 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in work of those trades with work of this Section.

3.3 INSTALLATION

- A. Install work of this Section in accordance with manufacturer's and referenced standard's recommended installation procedures.
- B. Coordinate placement of windows in wall openings with installation of rubberized membrane flashing installed in wall openings prior to placement of windows.
 - 1. Install windows with a continuous bead of sealant between back of window frame flange and flexible membrane flashing, except at sill flange.

- C. Make provision for expansion and contraction and for deflection of existing adjoining building components.
- D. Install insect screens on operable sash.
- E. Upon completion of installation, put each operating component through at least 10 complete operating cycles, adjusting as needed to secure optimum operating level.

3.4 CLEANING, ADJUSTMENT AND PROTECTION

- A. Labels: Leave required AAMA and NFRC labels in place, intact and legible, until reviewed and approved by Architect and building inspector.
- B. During warranty period, check, adjust and service moving parts for smooth and quiet operation.
- C. Prior to completion of work thoroughly clean exposed surfaces of windows and screens.
 - 1. Use only cleaning materials and techniques recommended by manufacturer of material being cleaned.
 - 2. Do not scratch or otherwise damage glass, screen, or PVC finish.
- D. Clean exposed surfaces and repair imperfections in finish.
- E. Do not store materials close enough to glass to create a heat trap and cause breakage.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes finish hardware for doors.
- B. Related Sections:
 - 1. Section 06 4000: Architectural Woodwork, for custom cabinet hardware.
 - 2. Section 08 1113: Hollow Metal Doors and Frames, to be provided templates for hardware.
 - 3. Section 08 1400: Wood Doors, to be provided templates for hardware.
 - 4. Section 08 4113: Aluminum-Framed Entrances and Storefronts, for hardware provided with aluminum entrances.
 - 5. Section 08 7113: Automatic Door Operators
 - 6. Section 12 3530: Residential Casework, for cabinet hardware.

1.2 SUBMITTALS

- A. Product data including manufacturer's technical data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
- B. Finish Hardware Schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
- C. Keying Schedule: Indicate clearly how Owner's final instructions on keying of locks has been fulfilled.
- D. Templates: For doors, frames, and other work specified to be factory prepared for the installation of door hardware.
 - 1. Verify with shop drawings and other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- E. Samples: Of each type of exposed hardware unit in finish indicated and tagged with full description for coordination with schedule. Submit samples prior to submission of final hardware schedule.
 - 1. Samples will be returned to supplier. Units that are acceptable and remain undamaged may after final check of operation may be incorporated in the work, within limitations of keying coordination requirements.

1.3 QUALITY ASSURANCE

- A. Provide services of an AHC or DAHC member of Door Hardware Institute to:
 - 1. Be available for consultation with Architect/Owner at no additional cost to Owner during progress of construction.
 - 2. Be available to meet with Owner to finalize keying requirements and to obtain final instructions in writing.
- B. Hardware consultant may be an employee of supplier.
- C. Single Source Responsibility: Obtain each type of hardware from a single manufacturer.

- D. Hardware supplier shall have and maintain a factory direct status with all manufacturers specified or approved during the course of the project to insure quality product knowledge and quick lead-time response.

1.4 REGULATORY REQUIREMENTS

- A. Provide door hardware for fire rated openings complying with NFPA Standard No. 80 and current requirements of authorities having jurisdiction.
 - 1. Provide only hardware that is listed and identical to products tested by U.L. or other testing and inspection agencies acceptable to governing authorities.
- B. Provide hardware tested according to NFPA 252 and UL 1784 for fire door assemblies labeled for fire resistance and smoke control ("S" label).
- C. Provide electric equipment with U.L. approved listing for complete assembly.
- D. Comply with requirements of ANSI A117.1., The Americans with Disabilities Act (ADA), and State Building Code accessibility requirements for the disabled.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Individually package each unit of finish hardware, complete with proper fastenings and appurtenances, clearly marked on outside to indicate contents and specific locations in Work.
- B. Provide an experienced employee designated to receive, take charge of, and distribute hardware at building site.
- C. Provide locked secure area for storage of hardware on site.
- D. Protect from damage. Store above ground and under cover.

1.6 KEYING INFORMATION

- A. If required provide keying and bitting information to Owner at no cost.

1.7 WARRANTY

- A. Warrant operation of closers for 10 years.
- B. Warrant operation of exit devices for 3 years.

1.8 CERTIFICATION

- A. Prior to Substantial Completion Date, provide written certificate that hardware is complete and conforms to Specifications and approved submittals.

PART 2 PRODUCTS

2.1 GENERAL

- A. Fasteners:
 - 1. Furnish necessary flat head screws, bolts, and other fasteners of suitable size and type to anchor hardware in position for long life under hard use.

2. Where necessary, furnish fasteners with expansion shields, sex bolts, and other anchors as required. Provide material to which hardware is to be applied, and recommended by hardware manufacturer.
 - a. Provide Glass Bead Kit if necessary for proper installation of exit devices.
 - b. Toggle bolts are not permitted.
3. Provide fasteners that harmonize with hardware as to finish and material.
4. Conceal if possible when door is in closed position; exposed fasteners to have Phillips head.
 - a. Through-Bolting Not permitted.

B. Locks and Latches: Verify:

1. Operation
2. Hand of doors
3. Function for each opening.

C. Closers: Verify for each door:

1. Hand of door
2. Degree of opening
3. Frequency of use
4. Head condition.
 - a. Provide closers that do not limit door swing.
 - b. Furnish drop plates for narrow top rails.
 - c. Furnish manufacturer's standard one-piece cast arm at parallel arm location.
 - d. Furnish closers at fire-resistant rated doors, exterior doors and elsewhere as shown.

D. Hinges:

1. Furnish hinges of sufficient throw to clear trim where hinges are required to swing 180 degrees.
2. Furnish minimum 1-1/2 pair of hinges per leaf, unless specifically scheduled otherwise.

E. Furnish silencers for door frames at rate of three for each single door and two for each door or pair of doors, except gasketed doors and doors with light seals or sound seals.

F. Furnish smoke gaskets for fire-resistive rated doors in corridors or other exitways.

G. Furnish door stops in number and type to protect finishes wherever doors or hardware thereon could strike adjacent surfaces.

2.2 KEYING

A. Factory or locally key the following:

1. Master or Grandmaster key per Owner's direction.

B. Furnish nickel silver keys for each lock as follows:

1. 6 masterkeys for each set
2. 3 grand-masterkeys.

3. 2 Change keys per lockset.

C. Construction keying:

1. Furnish a construction key system with 10 keys for locks and cylinders: 7 for Contractor and 3 for Owner.
2. Use only construction keys during construction.
3. Upon Substantial Completion of Work, void construction key system and, in presence of Architect and Owner, demonstrate specified keying system is operating properly.

D. Identification and delivery:

1. Stamp permanent keys, "DO NOT DUPLICATE".
2. Identify permanent keys with tags, and send direct to Owner by registered mail or receipted personal delivery.

E. Key storage cabinet

1. Manufacturer: MMF, Telkee, Yale, or approved.
2. Type: Surface mounted for wall, with key control tags.
3. Capacity: For required permanent keys plus 25 percent.
4. Location: As selected by Architect.

2.3 TOOLS AND MANUALS

- A. Deliver to Owner one complete set of adjustment tools and one set of maintenance manuals and installation instructions for locksets, closers, and panic devices.

2.4 ACCEPTABLE PRODUCTS

- A. Single Source: Except as specifically otherwise approved in advance by Architect, furnish for each items (such as "Door Hinge Type 1") product of a single manufacturer

B. Locks and Latches:

1. Latchbolt: Anti-friction type with curved strike lip.
 - a. Provide extended lip where necessary to protect door frame trim from damage.
 - b. Match hardware finish.
2. Fabricate with 3-3/4 inches backset from door edge where surface applied gasketing at door frame stops and 2-3/4 inches elsewhere.
3. Provide lever handle, unless otherwise indicated.

- C. Hinges: Mortise type, with non-removable pins at out-swinging doors with locks.

D. Exit Devices:

1. Furnish with provisions for concealed mounting. Through-bolts are not acceptable unless required by fire codes or fire tests.
2. Exit device to include impact resistant, flush mounted end cap. End caps shall be of heavy-duty alloy construction and provide horizontal adjustment for flush alignment with device cover plate. No raised edges shall protrude from end cap.
3. Exit devices must be furnished with hydraulic touchpad dampener for quiet operation of device.
4. Furnish all exit devices with deadlocking latchbolts and roller strikes.

5. Furnish required filler plates and shim kits for flush mounting of exit devices on all doors.
6. Supply plastic installation template to increase accuracy and decrease installation time.

E. Door Closers:

1. Mount on room side, and not corridor or lobby side of doors bordering circulation system unless otherwise shown.
2. Fasteners to be concealed.
3. Closer shall have heavy duty arms, adjustable spring power with indicator dial, stick-on templates, and self reaming/tapping screws.
4. Pressure relief valves are not permitted.

F. Stops:

1. Provide wall stops; do not install floor stops unless specifically approved by Architect.
2. If wall stops cannot be installed, provide concealed overhead holder.

G. Flush Bolts: Provide dust-proof strikes for floor locations.

H. Kickplates:

1. Provide metal kickplates specified in Door Hardware Groups.
2. Anchor kickplates with oval-head full-thread screws, spaced uniformly at a maximum of 5 inches on center at kickplate perimeter.

I. Provide hardware in finishes indicated in Door Hardware Groups.

J. Manufacturer and Acceptable Substitutes:

<u>Item:</u>	<u>Manufacturer:</u>	<u>Acceptable Substitute:</u>
1. Hinges:	Stanley (S)	Hager, Lawrence, McKinney
2. Locks/Latches:	Schlage (SC)	None
3. Cylinders:	Schlage (SC)	None
4. Exit Devices:	Von Duprin (VD)	None
5. Flush Bolts	Glynn Johnson (GJ)	Ives
6. Surface Closers:	LCN (L)	None
7. Push/Pulls	Tice (T)	Trimco, BBW, Ives
8. Stops/Catches:	Glynn Johnson (GJ)	H.B. Ives, Trimco, BBW
9. Kickplates	Tice (T)	Trimco, BBW
10. Weatherstripping/ Gasketing:	National Guard (NG)	Pemko
11. Door Bottom	National Guard (NG)	Pemko
12. Thresholds:	National Guard (NG)	Pemko

PART 3 EXECUTION

3.1 COORDINATION

- A. Coordinate as necessary with other trades to assure proper and adequate provision in work of those trades for interface with work of this Section.

3.2 INSTALLATION

- A. Install work of this Section in accordance with:
 - 1. Hardware groups specified.
 - 2. Approved Schedule.
 - 3. Applicable requirements of governmental agencies having jurisdiction.
 - 4. Templates.
 - 5. Manufacturer's and referenced standard's recommended installation procedures.
- B. Hardware Locations: Mount hardware at locations recommended by manufacturer, requirements of ANSI A117.1, ADA, and State Building Code, as applicable.
- C. Set units level, plumb and true to line and location.
 - 1. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- D. Cut and fit threshold or floor plates to door frame profile with mitered corner joints; weld multiple pieces together. Set in full bead of sealant.
 - 1. At carpet, install closer floor plates flush with structural substrate under carpet.
 - 2. Secure to substrate with positive anchoring devices.
- E. After fitting mortised hardware to surfaces to be painted, remove and store hardware in original package in a secure place, and permanently reinstall after painting has been completed.
 - 1. Properly wrap installed hardware subjected to hand usage during construction for protection; Replace hardware units at no expense to Owner where finish has been damaged by construction activities.

3.4 ADJUSTING, CLEANING, AND PROTECTION

- A. Upon completion of Work, and as a condition of acceptance, provide inspection, and adjustment of operating hardware, to ensure proper operation or function of every unit.
 - 1. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.
 - 2. Clean operating units as necessary to restore proper function and finish of hardware and doors.
- B. After ventilation system has been balanced, manufacturer's representative to adjust closers as necessary to meet ADA and State Building Code requirements for time required for closing operation and opening force.
- C. Clean adjacent surfaces soiled by hardware installation and repair damaged surfaces.
- D. Six Month and One Year Adjustment: Approximately six months, and prior to one year, after date of Substantial Completion, the installer, accompanied by representatives of the manufacturers of latchsets and locksets and door control devices, and of other major hardware suppliers, shall return to the Project to perform the following work:
 - 1. Examine and adjust each item of door hardware as necessary to restore proper operation and function of doors and hardware to comply with specified requirements.
 - 2. Replace hardware items that have deteriorated or failed due to faulty design, materials, or installation of hardware units.

3. Prepare a written report of current and predictable problems of substantial nature in the performance of the hardware.

3.5 DOOR HARDWARE GROUPS

MFG	QUANTITY	ITEM	PRODUCT DESCRIPTION	FINISH
HW1				
VD	1ea.	Exit Device	EL3347TL x less pull x RHR leaf	613
B	1ea.	Cylinder	1E74	613
VD	1ea.	Exit Device	3347EO	626
T	2ea.	Pull	40 x thru-bolt x mount at device centerline	613

Automatic Door Operator per 08 7113
 Remaining hardware by door manufacturer.

HW2

VD	1ea.	Exit Device	EL3347TL	613
SC	1ea.	Cylinder	1E74	613
GJ	1ea.	Overhead Stop	90S	613

Automatic Door Operator per 08 7113
 Remaining hardware by door manufacturer.

HW3

SC	1ea.	Storeroom Lockset	AL 80 PD NEP	626
S	4ea.	Hinges	CB1900 4.5 x 4.5 NRP	626
LCN	1ea.	Closer	P1460	626
IV	1ea.	Wall Stop	WS407 CCV	626
TR	1ea.	Kickplate	KO 050 10" x 34"	626

HW4

S	4ea.	Hinges	CB1900 4.5 x 4.5 NRP	626
IV	1ea.	Wall Stop	WS407 CCV	626
TR	1ea.	Kickplate	KO 050 10" x 34"	626
IV	1ea.	Push/Pull	8300 / 8102	626

HW5

S	1ea.	Double Acting Pivot	DAP 3	626
GJ	2ea.	Floor Stop	FB13	626
TR	2ea.	Kickplate	KO 050 10" x 34"	626
IV	2ea.	Push Plate	8300	626

HW6

SC	1ea.	Indicator Lockset	ND 85 PD SDA	626
S	3ea.	Hinges	FBB 179 4 1/2 x 4 1/2	626
LCN	1ea.	Closer	P1460	626
IV	1ea.	Wall Stop	WS407 CCV	626
TR	1ea.	Kickplate	KO 050 10" x 34"	626

HW7

SC	1ea.	Lockset	AL53 PD NEP	626
GJ	1ea.	Wall Stop	60W	626

Remaining hardware existing to remain.

HW8

SC	1ea.	Lockset	AL53 PD NEP	626
GJ	1ea.	Flushbolts	FB6W	626

Remaining hardware existing to remain.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes electric operated door hardware and controls for automatic door operation of swinging doors to provide access required for the disabled.
- B. Related Sections:
 - 1. Section 08 4113: Aluminum-Framed Entrances and Storefront
 - 2. Section 08 7100: Door Hardware.
 - 3. Division 26: Electrical, for electrical connections, including conduit and wiring.

1.2 DEFINITIONS

- A. Activation Device: Device that sends an electrical signal to the door operator to open the door.
- B. Safety Device: Device that prevents a door from opening or closing.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

- A. Provide electrically operated hardware with push plate and button control devices for doors scheduled for automatic operation.
- B. Door Operator Performance: Provide door operators that will open and close doors and maintain them in fully closed position when subjected to Basic Wind Speed in miles per hour at 33 feet above grade, based on ASCE 7, "Minimum Design Loads for Buildings and Other Structures, Section 6.4.2, "Analytic Procedure."
- C. Opening Force: Comply with the following maximum opening-force requirements for locations indicated:
 - 1. Exterior Doors: 15 lbf.
 - 2. Interior Doors: 5 lbf.
 - 3. Opening Force for Low-Energy Power-Operated Doors: Provide operators that require no more than 15 lbf to stop door movement.
- D. Provide for manual open and close operation of door of door in the event of power failure.

1.4 SUBMITTALS

- A. Product data for automatic door hardware, including the following:
 - 1. Data on operators, and accessories.
 - 2. Roughing-in diagrams.
 - 3. Parts lists and maintenance instructions for each type of operating component.
- B. Shop drawings, including:
 - 1. Layout and installation details, including relationship to adjacent work.
 - 2. Components and anchorage.
 - 3. Materials and finishes.
- C. Wiring diagrams detailing wiring for power operator, signal, and control systems differentiating clearly between manufacturer-installed wiring and field-installed wiring.

- D. Manufacturer's installation instructions indicating special procedures, conditions requiring special attention, and manufacturer's hardware and component templates.
- E. Maintenance data to include in maintenance manuals specified in Section 01 7700.
 - 1. Include instructions on how to perform safety tests, and the name, address, and telephone number of nearest authorized service.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Experienced for both installation and maintenance of type of units required for this Project, and is an authorized representative of the manufacturer.
 - 1. Maintenance Proximity: The Installer shall maintain offices and repair or service facilities not more than 2 hours normal travel time from the Project site.
- B. Manufacturer's Qualifications: Firm manufacturing systems that are similar to those indicated for this Project and with a record of successful in-service performance.
- C. Provide powered door operators that comply with requirements of UL 325.

1.6 PROJECT CONDITIONS

- A. Coordinate work of this Section with other hardware scheduled for automatic doors Section 08 7100.
- B. Coordinate door components and adjacent construction with requirements for automatic door hardware installation for a concealed assembly.

1.7 WARRANTY

- A. Provide a written warranty executed by manufacturer agreeing to repair or replace components of the automatic door hardware system that fail in materials or workmanship within 5 years from date of Substantial Completion.

1.9 MAINTENANCE SERVICE

- A. Maintenance: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of automatic door hardware installer.
 - 1. Include quarterly planned and preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper automatic door operation.
 - 2. Provide parts and supplies as used in the manufacture and installation of original equipment.
 - 3. Perform maintenance, including emergency callback service, during normal working hours.
- B. Maintenance Materials: Provide wrenches and tools required for maintenance of equipment.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by one of the following for Electromechanical-Operated Swinging Units:
1. Besam Inc.
 2. Horton Automatics; Div. of Overhead Door Corporation.
 3. record-usa.
 4. RotoSwing; Div. of EFCO Corporation.
 5. Stanley Access Technologies; Div. of The Stanley Works.
- B. Substitutions: Submit according to requirements of Section 01 2500.

2.2 AUTOMATIC DOOR OPERATION

- A. Door Configuration:
1. Swinging doors for two-way traffic.
- B. Activation Device Equipment:
1. Wall push-plate switch.
- C. Operator Safety Devices:
1. Infrared-scanner presence detector.

2.3 DOOR OPERATORS

- A. Provide operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for type of occupancy indicated. Comply with the following:
1. Type: Power operated, complying with ANSI/BHMA A156.10.
 2. Connections: Provide connections for power and control wiring.
 3. Adjustment Features: Provide operators that are fully adjustable without removal of doors, and can be adjusted for opening, closing, and checking speeds, and length of time the door remains open.
 4. Provide on/off/hold-open switch to control electric power to operator.
- B. Electromechanical Operators:
1. Self-contained overhead units.
 2. Provide closing speed controlled by gear train and dynamic braking action of electric motor, with manual operation and spring closing when power is off.
 3. Closing Mechanism: Power-assisted spring closing for overcoming wind and static pressures.
 4. Concealed.
 5. Manual Operation: Operation shall require less than 15 lbf to release a latch, 30 lbf to set door in motion, and 15 lbf to fully open door when power is off, according to ANSI/BHMA A156.19.
 6. Emergency Operation: Provide emergency release for manual swing- out action of doors functioning as exits.
 7. Hold-open Switch: Equip units with hold-open switch arranged to hold door open without continued use of power.

2.4 ACTIVATION AND SAFETY DEVICES

A. Infrared-Scanner Presence Detector:

1. Self-contained scanner detector consisting of an infrared presence- sensing device to activate door operator as a safety device.
2. Sensing device shall be adjustable to provide detection patterns and sensitivity equivalent to those required for control mats.
3. Provide metal or plastic housing with black finish for sensing device.

B. Wall Push-Plate Switch: Manufacturer's standard semi-flush, wall-mounted, door control switch; consisting of round or square, flat push plate; of material indicated; and controlling actuator mounted in recessed junction box. Provide engraved message indicated.

1. Material: Stainless steel.
2. Message: International symbol of accessibility and "Push to Open."
3. Size: 1-3/4 inches wide by 4-1/2 inches high.

C. Electrical Interlocks: Unless units are equipped with self-protecting devices or circuits, provide electrical interlocks to prevent activation of operator when door is locked, latched, or bolted.

2.5 FINISHES

A. Exposed Operator and Components: As selected by Architect from manufacturer's standard range.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine conditions affecting installation of automatic door hardware.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Furnish templates, diagrams, and other data to fabricators and installers of related work for coordination of the automatic door hardware installation.
- B. Verify that electric power is available and of the correct characteristics.

3.3 INSTALLATION

- A. Install complete door operator system in accordance with manufacturer's instructions, including piping, controls, control wiring, and remote power units.
 1. Refer to Division 26 for connection to electrical power distribution system.
- B. Provide for dimensional distortion of components during operation.
- C. Activation and Safety Devices: Install control devices and wiring, including connections to door operators, as follows:
 1. Infrared-Scanner Presence Detectors: Install safety device as recommended by manufacturer.
 2. Wall Switches: Provide push plates on both sides of opening as indicated.

- D. Coordinate installation of components with related and adjacent work, level and plumb.

3.4 ADJUSTING

- A. Adjust door operators, controls, and hardware for smooth and safe operation and for weathertight closure.
- B. Readjust door operators and controls after repeated operation of completed installation equivalent to three days' use by normal traffic (100 to 300 cycles). Lubricate hardware, operating equipment, and other moving parts.

3.5 DEMONSTRATION

- A. Engage manufacturer's inspector certified by the American Association of Automatic Door Manufacturers to train Owner's maintenance personnel to adjust, operate, and maintain automatic door operators.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes glazing for the following applications:
 - 1. Windows
 - 2. Doors
 - 3. Mirrors

- B. Related Sections:
 - 1. Section 08 1113: Standard Hollow Metal Doors and Frames
 - 2. Section 08 1400: Wood Doors
 - 3. Section 08 4113: Aluminum-Framed Entrances and Storefronts

1.2 PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

- B. Glass Design: Glass thicknesses indicated are minimum and are for detailing only. Confirm glass thicknesses indicated in Glass Product Schedule by analyzing Project loads and in-service conditions. Provide glass in lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
 - 1. Select minimum glass thicknesses to comply with ASTM E 1300 according to design wind loads applicable to Project according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures."
 - a. Probability of Breakage for Vertical Glazing: 8 lite per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.
 - 1) Load Duration: 60 seconds or less.
 - b. Minimum Glass Thickness for Exterior Lites: Not less than 6 mm, except where window system is shop glazed and tested by manufacturer of window to perform as specified.

1.3 SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated.

- B. Samples: With each product data submitted, other than monolithic clear float glass, include:
 - 1. Glass: 12 by 12 inch samples of each type.
 - 2. Sealants and Gaskets: 12 inches long of each type installed between samples of material to be glazed, fully cured.

- C. Glazing Schedule: Use same designations indicated in Drawings, listing glass types and thicknesses for each size opening and location.

- D. Warranties: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Use skilled workers trained and experienced in necessary crafts, familiar with specified requirements and methods of installation for proper performance of Work of this Section.
- B. Source Limitations: Provide glass materials from one primary glass manufacturer for each type of glass specified.
 - 1. Insulating Glass: Obtain components for each type of unit from same source as used in other applications for same components.
 - 2. Provide glazing accessories from one source for each product and installation method indicated.
- C. Comply with applicable recommendations contained in the following publications, unless more stringent requirements are indicated:
 - 1. GANA Publications: GANA's "Glazing Manual".
 - 2. IGMA Publication for Insulating Glass: SIGMA TM-3000. "Glazing Guidelines for Sealed Insulated Glass Units."
- D. Safety Glass: Comply with ANSI Z97.1 and testing requirements of 16 CFR, Part 1201.
- E. Insulating Glass Certification: Permanently mark on each unit with appropriate certification label of Insulating Glass Certification Council.

1.5 REGULATORY REQUIREMENTS

- A. Comply with safety glazing requirements of State Building Code, Section 2406.
- B. Comply with wind loading requirements of State Building Code.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions, and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1.8 WARRANTY

- A. General Warranty: Provide written warranty against failure of glazing products due to defective materials or installation, including water leakage or air infiltration in excess of specified standard, for a period of 2 years after date of Substantial Completion.
- B. Manufacturer's Special Warranties: Provide the following on manufacturer's standard form, made out to Owner and signed by manufacturer:
 - 1. Insulating Glass: 10 year labor and materials to warrant units against failure of hermetic seal.

2. Coated Glass: 10 year labor and materials to replace unit deterioration including peeling, cracking, and other indications of deterioration in metallic coating.

PART 2 PRODUCTS

2.1 GLASS MATERIALS

- A. Products: Provide products that comply with requirements indicated in the Glass Product Schedule at end of Part 3.
- B. Annealed Float Glass: ASTM C 1036, Type I (transparent flat glass), Quality Q3 (glazing select), of class indicated in the Glass Product Schedule.
- C. Heat-Treated Float Glass: ASTM C 1048, Type I, (transparent flat glass) Quality Q3 (glazing select), class, kind, and condition indicated in the Glass Product Schedule.
 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
 2. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses produced by differential shading of individual lites and to comply with glass design requirements.
 3. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS float glass where safety glass is indicated or required by State Building Code.
 - a. Safety Glass: Where fully tempered glass is used as safety glass, provide products complying with ANSI Z97.1 and testing requirements of 16 CFR, Part 1201, for Category I or II materials as applicable.
- D. Sputter Coated (Low E) Float Glass: ASTM C 1376, float glass with metallic oxide or metallic nitride deposited by vacuum deposition process after manufacture and heat treatment (if any).
- E. Insulating Glass: ASTM E 774 for Class CBA units, complying with requirements in Glass Product Schedule, and following:
 1. Sealing System: Dual Seal.
 2. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses produced by differential shading of lites and to comply with glass design requirements.
 3. Provide Kind FT (fully tempered) float glass in place of annealed of Kind HS glass where safety glass is indicated or required by State Building Code.
- F. Mirror Glass: ASTM C1036, Type 1 transparent flat, Class I clear, quality q2 mirror; 1/4 inch thick; size as indicated.

2.2 GLAZING SEALANTS

- A. General: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

- B. Elastomeric Glazing Sealants: Comply with ASTM C 920, Type S (single component), Class 100/50, Grade NS (non-sag); Use NT (nontraffic), M, G, A, and, as applicable to glazing substrates, O.
 - 1. Acceptable Manufacturers and Types, or approved as recommended by window assembly manufacturer:
 - a. Dow Corning; 790.
 - b. General Electric; SilPruf LM SCS2700.
 - c. Pecor; 864.
 - d. Sonneborn Div of ChemRex, Inc; Omniseal.
 - e. Tremco: Spectrem 3.

2.3 GLAZING TAPE

- A. Back-Bedding Mastic Glazing Tape: Preformed, butyl based elastomeric tape complying with ASTM C 1281 and AAMA 800.
- B. Expanded Cellular Glazing Tape: Closed cell, PVC foam tape, factory coated with adhesive on both surfaces, complying with AAMA 800, for applications where tape acts as a primary seal or is used in combination with a full bead of sealant.

2.4 GLAZING GASKETS

- A. Compression Gaskets: Molded or extruded gaskets of material and type recommended by window assembly manufacturer for application, of profile and hardness required to maintain watertight seal.

2.5 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide other materials complying with referenced glazing standard and requirements of glass manufacturers as required for applications indicated.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85 plus or minus 5.
- D. Spacers and Edge Blocks: Elastomeric blocks or continuous extrusions of Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place and to limit glass lateral movement.
- E. Mirror Molding: ASTM A167, Type 302 or 304 stainless steel; 22 gage, No. 4 stain finish.
- F. Mirror Adhesive: Chemically compatible with mirror coating and wall substrate.

2.6 FABRICATION

- A. Fabricate glass and other glazing products in sizes required to glaze openings as indicated for Project.
 - 1. Provide edge and face clearances, edge and surface conditions, and bite complying with referenced standards and requirements of product manufacturers.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine framing glazing for compliance with the following:
1. Manufacturing and installation tolerances for size, squareness, and offsets at corners.
 2. Presence and functioning of weep system for exterior glazing.
 3. Minimum required face or edge clearances.
 4. Effective sealing between joints of glass framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.3 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in work of those trades for interface with work of this Section.

3.4 GLAZING, GENERAL

- A. General: Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
1. Protect glass edges from damage during handling and installation.
 2. Apply primers to joint surfaces where required for adhesion of sealants, as determined by sealant compatibility and adhesion testing.
- B. Install setting blocks sized and located to comply with referenced glazing publications, unless otherwise recommended by glass manufacturer.
1. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- C. Provide spacers for glass lites where length plus width is larger than 50 inches, and as follows:
1. Locate spacers directly opposite each other on both inside and outside faces of glass.
 2. Install correct size and spacing of spacers to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances.
 3. Provide 1/8 inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- C. Inspect each piece of glass immediately prior to start of installation.
1. Do not install items that are improperly sized, have damaged edges, or are scratched, abraded, or damaged in any other manner.
 2. Set glass so distortion waves, if present, run in horizontal direction.
 3. Set glass in a manner which produces greatest possible degree of uniformity in appearance

- D. Glaze steelwork with closed cell tape bedding and silicone sealant.
- E. Do not use 2 different glazing materials in same joint system.
- F. Miter-cut and seal joints of glazing gaskets in accordance with manufacturer's recommendations to provide watertight and airtight seal at corners and other locations where joints are required.
- G. Compress glazing tape or gaskets at least 25 percent of material thickness, with minimum finished thickness of 3/32 inch.

3.5 CLEANING AND PROTECTION

- A. Protect glass from damage after installation by attaching crossed streamers or ribbons to framing held free from glass. Do not apply markers to glass surface.
- B. Remove excessive glazing compound from glazing and adjacent surfaces without damaging glass or adjacent surfaces.
- C. Replace broken, cracked, scratched, or otherwise damaged glass.
- D. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter.
 - 1. Protect glass surfaces adjacent to or below exterior concrete and masonry surfaces from build up of dirt, scum, alkaline deposits, or stains.
- E. Remove nonpermanent labels and clean glass surfaces on both sides no more than four days before date of Substantial Completion.

3.6 GLASS PRODUCT SCHEDULE

- A. Glass Type GL-1: Insulating glass units complying with following requirements:
 - 1. Overall Unit Thickness: 12 mm (1/2 inch).
 - 2. Thickness of Each Lite: 3.0 mm (1/8 inch).
 - 3. Interspace Content: Argon.
 - 4. Uncoated Clear Indoor Lite: Class 1 (clear) float glass.
 - 5. Coated Clear Outdoor Lite: Condition C (other coated glass), Class 1 (clear) float glass.
 - 6. Low-Emissivity Coating: Sputter coat on second or third surface.
 - 7. Performance Minimums:
 - a. Daylight Transmittance: 72 percent
 - b. Winter U-Value: 0.32
 - c. Solar Heat Gain Coefficient 0.41
- B. Glass Type GL-1T: Same as Type GL-1, except both lites Kind FT (fully tempered).
- C. Glass type GL-2: Uncoated, single pane glass units complying with following requirements:
 - 1. Thickness of Lite: 6.0 mm (1/4 inch).
 - 2. Class 1 (clear) float glass.

- D. Glass type GL-2T: Tempered, uncoated, single pane glass units complying with following requirements:
1. Thickness of Lite: 6.0 mm (1/4 inch).
 2. Kind FT (fully tempered), Condition A, (uncoated) Class 1 (clear) float glass.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes louvers and vents.
- B. Related Sections:
 - 1. Section 07 6000: Flashing and Sheet Metal
 - 2. Section 07 9200: Joint Sealants
 - 3. Division 23: Heating, Ventilating, and Air Conditioning, for louvers that are a part of HVAC equipment, and HVAC ducts connected to louvers.

1.2 PERFORMANCE REQUIREMENTS

- A. Provide louvers that meet or withstand the following minimum performance ratings or requirements:
 - 1. Structural Performance: Gravity and wind loads based on minimum uniform pressure of 25 lbf/sq. ft.
 - 2. Seismic Performance: ASCE 7, "Minimum Design Load of Buildings and Other Structures.
 - 3. Thermal Movements: Temperature change of 120 degrees F, ambient; 180 degrees F, material surfaces.
 - 4. Air Performance, Water Penetration, and Wind Driven Rain Ratings: As demonstrated by testing manufacturer's stock units according to AMCA 500-L.

1.3 SUBMITTALS

- A. Product Data, for each type of product specified. Include printed catalog pages showing AMCA Certified Ratings Seals, or evidence that product has been tested according to AMCA 500-L.
- B. Shop Drawings, to show plans, elevations, sections, details, attachments to other work, and interface with adjacent construction.
 - 1. Verify louver and vent openings by field dimensions prior to fabrication and indicate measurements on Shop Drawings.

1.4 QUALITY ASSURANCE

- A. Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.
- B. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.2, "Structural Welding Code—Aluminum.
 - 2. AWS D1.3, "Structural Welding Code—Sheet Steel.
- C. Coordinate as required with other trades to assure proper and adequate provision of work of those trades for interfacing with work of this Section.
 - 1. Coordinate location, size, and other necessary requirements for proper connection of mechanical ductwork to louvers and vents.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products of one of the following:

1. Fixed Louvers and Wall Vents:
 - a. The Airolite Company.
 - b. Cesco Products.
 - c. Construction Specialties, Inc.
 - d. Greenheck
 - e. Nystrom Building Products.
 - f. Ruskin Company; Tomkins PLC.

B. Substitutions: Submit according to requirements of Section 01 2500.

2.2 MATERIALS

- A. Aluminum Extrusions: ASTM B 221, alloy 6063-T5, T-52 or T-6.
- B. Aluminum Sheet: ASTM B 209, alloy 3003 or 5005.
- C. Fasteners: 300 stainless steel or same basic metal and alloy as fastened metal.
- D. Bituminous Paint: ASTM D 1187, cold-applied asphalt emulsion.

2.3 FABRICATION, GENERAL

- A. Fabricate frame to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
- B. Maintain equal louver blade spacing to produce uniform appearance.
- C. Join frame members to each other and to louver blades with fillet welds, threaded fasteners, or both, as standard with manufacturer, concealed from view.

2.4 FIXED ALUMINUM LOUVERS

- A. Type: Drainable head and blade louvers.
- B. Basis-of-Design Product: Greenheck ESD-403.
- C. Components:
 1. Frame: 0.081 inch wall thickness.
 2. Blades: 0.081 inch thickness.
 3. Frame Depth: 4 inches.
 4. Size: As shown.
 5. Bird Screen: 1/2 inch square mesh with 0.063 inch wire, or 3/4 by 0.050 inch thick flattened, expanded aluminum.
 6. Louver Factory Finish: Kynar 500.
 - a. Color: As selected from manufacturer's standard.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and openings for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make weathertight connection.
- C. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
 - 1. Set flanges and flashings in sealant specified in Section 07 9200.
- D. Dissimilar Metal Protection: Protect galvanized and nonferrous metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.
- E. Where HVAC duct meets inside face of louver, provide sheet metal closure between perimeter of louver and perimeter of duct; paint exterior face of closure panel flat black.

3.3 CLEANING AND ADJUSTMENT

- A. Clean exposed surfaces with water. Do not use acid or abrasive cleaners.
- B. Repair damaged finishes so that no evidence remains of corrective work.
 - 1. Replace items that cannot be refinished in the field, or return to factory for refinishing of entire unit.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes gypsum board and accessories including the following:
 - 1. Interior gypsum board.
 - 2. Exterior gypsum board panels for ceilings and soffits.
 - 3. Tile backing panels.
 - 4. Grid suspension systems for ceilings.

- B. Related Sections:
 - 1. Section 06 1000: Rough Carpentry, for wood framing that supports gypsum board and exterior gypsum sheathing.
 - 2. Section 07 2100: Thermal Insulation.
 - 3. Section 09 3000: Tiling, for tile backer board installed as substrate for tile.
 - 4. Section 09 8110: Acoustic Insulation and Sealant.
 - 5. Section 09 9000: Painting, for gypsum board paint finish.

1.2 DEFINITIONS

- A. Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA-505 for definitions of terms for gypsum board assemblies.

1.3 SUBMITTALS

- A. Product Data, for each type of product indicated.

1.4 QUALITY ASSURANCE

- A. Use skilled workers trained and experienced in necessary crafts and familiar with requirements and methods needed for proper performance of work of this Section.
 - 1. Installer: Company with not less than 3 years experience installing gypsum board systems in project of similar size, quality and complexity under present name.

- B. Comply with the following standards:
 - 1. ASTM C 840, Specification for Application and Finishing of Gypsum Board.
 - 2. Gypsum Association Document GA-216, Application and Finishing of Gypsum Board.
 - 3. Northwest Wall and Ceiling Bureau recommendations for gypsum wallboard finishes.

- C. For fire-resistant rated partitions, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
 - 1. Line blockouts in walls for recessed toilet accessories, fire extinguisher cabinets, and the like, with gypsum board as necessary to preserve fire-resistive rating of partition.

- D. Mockup:
 - 1. At an area on site approved by Architect, provide a mockup gypsum wallboard panel.
 - a. Provide one mock-up panel for each gypsum wallboard finish used in work.
 - b. Minimum panel width 8 feet wide by full height of partition.
 - c. Obtain Architect's approval prior to starting work.
 - d. Approved mockups may be incorporated into finished Work.

2. Maintain mockup panels during construction in a undisturbed condition as a standard for judging completed work.
3. Demolish rejected mockup panels and remove from job site.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials inside under cover, dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes.

1. Store gypsum panels flat in a manner to prevent sagging.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

- B. Do not install interior products until installation areas are enclosed and conditioned.

- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

- D. Maintain sufficient ventilation for proper joint treatment drying.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products of the following:

1. Gypsum Products:

- a. BPB America, Inc.
- b. G-P Gypsum.
- c. National Gypsum Company.
- d. USG Corporation.

2. Metal and Plastic trim:

- a. AMICO.
- b. Beadex.
- c. Plastic Components, Inc.
- d. Vinyl Corp.

3. Special Moldings and Reveals:

- a. Fry Reglet Corporation.
- b. Gordon, Inc.

- B. Substitutions: Submit in accordance with requirements of Section 01 2500.

2.2 GRID SUSPENSION ASSEMBLY FOR INTERIOR CEILINGS

- A. System: Manufacturer's standard direct-hung grid suspension system composed of main beams and cross-furring members that interlock to form a modular supporting grid network for gypsum board ceiling assemblies.
- B. Acceptable Products:
 - 1. Armstrong World Industries, Inc; Drywall Grid Systems.
 - 2. Chicago Metallic Corporation; 640 Drywall Furring Suspended Ceiling System.
 - 3. Drywall Grid System, by BPB Celotex.
 - 4. USG Corporation; Drywall Suspension System.

2.3 INTERIOR GYPSUM BOARD

- A. General: Complying with ASTM C 36 or ASTM 1396, as applicable to type of gypsum board indicated and whichever is more stringent.
- B. Gypsum Board: 5/8 inches thick with long edges tapered; Fire retardant Type X.
 - 1. Gypsum board complying with ASTM C 442 may be used for gypsum backing board for multilayer applications, 5/8 inches thick, Type X.
- C. Flexible Gypsum Wallboard: Manufactured to bend to fit radii and to be more flexible than standard regular type panels of the same thickness.
 - 1. Thickness: 1/4 inch.
 - 2. Available Products:
 - a. BPB America Inc.; "ProRoc 1/4 inch Flex" Gypsum Board."
 - b. G-P Gypsum; "ToughRock FlexRoc Gypsum Board."
 - c. National Gypsum Company; "High Flex Brand Wallboard."
 - d. USG Corporation; "SHEETROCK" Brand 1/4 Inch Gypsum Panels.

2.4 EXTERIOR GYPSUM BOARD FOR CEILINGS AND SOFFITS

- A. Glass-Mat Gypsum Sheathing Board: ASTM C 1177, Type X, 5/8 inch thickness, unless otherwise indicated.
 - 1. "DensGlass Gold Fireguard Exterior Guard" by G-P Gypsum, or approved.
- B. Exterior Gypsum Soffit Board: ASTM C 931, Type X, 5/8 inch thickness, unless otherwise indicated.

2.5 TILE BACKING PANELS

- A. Glass-Mat Water-Resistant Gypsum Tile Backing Board; ASTM C 1178, Type X, 5/8 inches thickness:
 - 1. Products: Subject to compliance with requirements, provide one of the following, or approved:
 - a. Product: "DensShield Fireguard Tile Guard" by G-P Gypsum.

2.6 TRIM ACCESSORIES

A. Interior Trim: Comply with ASTM C 1047.

1. Material: Galvanized steel sheet or plastic.
2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.
 - g. Curved-Edge Cornerbead: With notched or flexible flanges.

B. Exterior Trim: Comply with ASTM C 1047.

1. Material: Galvanized steel sheet.
2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped: exposed long flange receives joint compound.
 - c. Expansion (Control) Joint: One-piece, rolled zinc with V- shaped slot and removable strip covering slot opening.

C. Special Moldings and Reveals:

1. Extruded 6063 T5 aluminum alloy in clear anodized finish.
2. Type: As shown on Drawings.

2.7 AUXILIARY MATERIALS

A. Steel Drill Screws: ASTM C 1002 and GA-216:

B. Acoustic Insulation (Sound Attenuation Blankets) and Acoustical Sealant: Specified in Section 09 8110.

C. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

D. Spot Grout: ASTM C 475, setting-type joint compound recommended for spot-grouting hollow metal door frames.

2.8 JOINTING SYSTEM

A. General: Comply with ASTM C 475.

B. Joint Tape:

1. Interior Gypsum Wallboard: Paper.
2. Glass-Mat Tile Backing Panels: Glass mesh joint type as recommended by panel manufacturer.
3. Glass-Mat Gypsum Sheathing Board: 10 by 10 mesh.
4. Exterior Gypsum Soffit Board: Paper.

C. Joint Compound:

1. Interior Wallboard:

- a. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
- b. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.

1) Use setting-type compound for installing paper-faced metal trim accessories.

- c. Fill Coat: For second coat, use setting-type, sandable topping or drying-type, topping compound.
- d. Finish Coat: For third coat, use setting-type, sandable topping or drying-type, topping compound.
- e. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping or drying-type, topping compound.
- f. Optional Latex Surfacing: For final coat of Level 5 finish, use high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish; one of the following:

- 1) National Gypsum Company: "ProForm" Brand Surfacer/Primer.
- 2) Sherwin Williams: "PrepRite" High Build Interior Latex Primer/Sealer.
- 3) USG Corporation: Sheetrock Brand "Tuff-Hide" Primer-Surfacer.
- 2) USG Corporation: Sheetrock Brand Primer-Surfacer.

2. Exterior Applications:

- a. Exterior Soffit Board: Use setting-type taping and setting-type, sandable topping compounds.
- b. Glass-Mat Gypsum Sheathing Board: As recommended by manufacturer.

3. Tile Backing Panels:

- a. Glass-Mat Water-Resistant Gypsum Tile Backing Board: As recommended by backing panel manufacturer.

D. Soffit Board Surfacing:

- 1. Glass-Mat Gypsum Sheathing Board for Exterior Soffits: G-P Gypsum Speed Set surfacing as recommended by manufacturer.

2.9 TEXTURE FINISHES

A. Products: Subject to compliance with requirements, the following, or approved, for water-based, job-mixed, drying-type texture finish for spray application:

- 1. Product: SHEETROCK Wall and Ceiling Spray Texture, ready-mixed, by USG Corporation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates and verify conditions are ready to receive work of this Section.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordinate as required with other trades to assure proper and adequate provision in work of those trades for interface with work of this Section.

3.3 GRID SUSPENSION SYSTEM FOR INTERIOR CEILINGS

- A. Install suspended drywall framing system in accordance with manufacturer's instructions.
- B. Attach perimeter wall track or angle where grid suspension system meets vertical surfaces.
- C. Mechanically join main beam and cross-tee members to each other and butt-cut to fit into wall track or angle.
- D. Install cross-tees at 16 inches o.c.

3.4 SOUND CONTROL PARTITIONS

- A. Install acoustic batt insulation and acoustical sealant in partitions designated for sound control.
- B. Install acoustic insulation specified in Section 09 8110.
- C. Acoustical Sealant:
 - 1. Install acoustical sealant specified in Section 09 8110.
 - 2. Seal construction at perimeters and at openings and penetration with a continuous bead of acoustical sealant.
 - a. Comply with ASTM C 919 for application of acoustical sealant.
 - b. Where partitions meet ceilings and floors, Apply a continuous bead of sealant between a maximum gap of 1/2 inch between floor and bottom edge of gypsum board, or between ceiling and top edge of gypsum board.
 - 1) Provide sealant full depth of gypsum board facings; do not skim coat over sealant.
 - c. Apply acoustical sealant around penetrations, such as electrical boxes, pipes, and other items penetrating partitions.
 - 3. Apply fire-resistant acoustical sealant at fire-rated acoustical walls.

3.5 GYPSUM BOARD INSTALLATION

- A. General: Install and finish gypsum board to comply with ASTM C 840 and GA-216.
 - 1. Butt panel together for a light contact at edges and ends, with not more than 1/16 inch of open space between panels. Do not force into place.
 - 2. Locate edge and end joints over supports.
 - 3. At internal and external corners, conceal cut edges of boards by overlapping covered edges of abutting boards.
 - 4. Do not make joints other than control joints at corners of framed openings.

5. Maintain 3/8 inch minimum distance between fastener and board edge.
 - a. Drive specified screws with clutch-controlled power screwdrivers.
 - b. Dimple board surface 1/32 inch with fastener; do not fracture face paper.
 6. Screw Fastener Schedule:
 - a. Panel Perimeter Spacing: 8 inches o.c., unless otherwise noted.
 - b. Panel Intermediate Support Spacing:
 - 1) Walls: 12 inches o.c., typical.
 - 2) Walls with Panels as Tile Substrate: 8 inches o.c.
 - 3) Ceilings: 8 inches o.c.
 7. Isolate perimeter of non-load bearing partitions at structural abutments, except at floors.
 - a. Provide 1/4 to 1/2 inch wide joints at these locations.
 - b. Trim edges with U-bead edge trim where edges of gypsum board are exposed.
 - c. Seal joints with acoustical sealant, comply with ASTM C 919.
- B. Walls:
1. Install gypsum board with tapered edges vertical, and to within 1/4 inch of floor, unless horizontal application is required by GA or UL listing for wall types.
 2. Stagger joints on opposite sides of partition.
 3. Multi-layer Applications:
 - a. Offset face layer joints at least one stud or furring member from base layer joints.
 - b. Fasten base layer with screws and face layer with adhesive and supplementary fasteners, unless otherwise indicated.
 4. Direct Bonding to Substrate: Comply with gypsum board manufacturer's recommendations. Temporarily brace or fasten panels until adhesive has set.
- C. Walls as Substrate for Tile:
1. Install glass-mat water-resistant gypsum backer board in accordance with manufacturer's installation instructions.
- D. Ceilings:
1. Install gypsum board to ceilings with long dimension of board at right angles to supporting members.
 2. Board may be installed with long dimension parallel to supporting members that are spaced 16 inches o.c. when attachment members are provided at end joints.
 3. Multi-layer Applications:
 - a. Offset face layer joints at least one stud or furring member from base layer joints.
 - b. Fasten both base layer and face layer with screws, and with adhesive between layers.

E. Exterior Gypsum Soffit Board:

1. Install panels perpendicular to supports, with end joints staggered and located over supports.
2. Install with 1/4 inch open space where panels abut other construction or structural penetrations.
3. Fasten with corrosion-resistant screws.
4. Trim edges with U-bead edge trim where edges of gypsum board are exposed.
5. Seal joints with sealant.

3.6 ALLOWABLE INSTALLATION TOLERANCES

- A. Maximum Ceiling Deflection: Provide framing and thickness of gypsum board, fastened as required, to achieve maximum deflection of 1/360 of span.
- B. Maximum Deviation from True Plane: 1/8 inch per 10 foot, and 1/16 inch in any running foot.
1. Check trim for conformance to tolerances.

3.7 CONTROL JOINTS

- A. Provide control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
1. Locate control joints at 30 feet maximum in ceilings, and 50 feet maximum in walls.

3.8 CORNER TREATMENT

- A. Internal Corners: Treat as specified for joints, but fold reinforcing tape lengthwise through middle and fit neatly into corner.
- B. External Corners and Exposed Edges:
1. Install specified corner bead, fitting neatly over corner and securing with same type fasteners used for installing wallboard.
 2. Space fasteners approximately 6 inches o.c. and drive through wallboard into framing or furring member.

3.9 OTHER TRIM

- A. Drawings do not show locations and requirements for all trim.
1. Carefully study Drawings and installation, and provide trim normally recommended by manufacturer of gypsum board.
- B. Install 3/4 inch wide rolled formed profiles at exterior soffits.

3.10 GYPSUM BOARD FINISHING

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly removed residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or bevel edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim accessories not requiring tape.

D. Levels of Finish: Comply with GA-214, and recommendations of Northwest Wall and Ceiling Bureau for gypsum board finishes, as follows:

1. Level 1, One Coat Application: Above ceiling and concealed areas, unless a higher level of finish is required for fire-resistive-rated assemblies and sound-rated assemblies.
2. Level 2, One Coat Application: Where panels form substrate for tile.
3. Level 3, Two Coat Application: Gypsum board surfaces to receive heavy grade, backed wall covering, or where acoustical panels are mounted on walls.
4. Level 4, Three Coat Application: Gypsum board surfaces with textured paint finish, flat paint finish, unbacked wall covering.
5. Level 5, Three Coat Application with a Skim Coat or Latex Surfer: Gypsum board surfaces with smooth texture paint finish, or paint finish with higher level of gloss than flat.

E. Application of Levels of Finish:

1. Level 1 Finish: One coat application.
 - a. Embed tape in joint compound with surfaces free of excess joint compound.
 - b. Tool marks and ridges are acceptable.
 - c. Cover fastener heads with one coat of joint compound in fire resistive assemblies.
2. Level 2 Finish: One coat application.
 - a. Embed tape in joint compound, wipe off excess and leave a thin coat of joint compound over tape.
 - b. Tool marks and ridges are acceptable.
 - c. Cover fastener heads with one coat of joint compound.
3. Level 3 Finish: Two coat application.
 - a. Embed tape in joint compound leaving a smooth thin coat of joint compound over tape.
 - b. Apply a separate coat of joint compound over the dry first coat, leaving a smooth surface free of ridges, tool marks and sanding grooves.
 - c. Cover fastener heads with a coat of joint compound followed with separate second as described above for taped joints.
 - d. When finishing compounds are dry, sandpaper to obtain a uniformly smooth surface, taking care to not scuff paper surface of wallboard.
 - e. Wipe gypsum board surfaces with damp cloth.

4. Level 4 Finish: Three coat application.
 - a. Embed tape in joint compound leaving a smooth thin coat of joint compound over tape.
 - b. Apply a separate coat of joint compound over the first coat, leaving a smooth surface free of ridges, tool marks and sanding grooves.
 - c. Apply a final coat of joint compound feathered out over the second coat, leaving a smooth surface flush with gypsum board and free of all marks. Feather finishing compound to not less than 12 inches wide.
 - d. Cover fastener heads with a coat of joint compound followed with separate second and final coats as described above for taped joints.
 - e. When finishing compounds are dry, sandpaper to obtain a uniformly smooth surface, taking care to not scuff paper surface of wallboard.
 - f. Wipe gypsum board surfaces with damp cloth.
5. Level 5 Finish: Three Coat Application for Level 4 Finish with a Skim Coat or Latex Surfacer.
 - a. Skim Coat: A thin coat of joint compound over entire finished gypsum board surface. Wipe down immediately, leaving a tight smooth film of joint compound.

- F. Exterior Soffit Board: Tape joints and apply specified surfacing compound over entire exposed surface in accordance with gypsum soffit board manufacturer's instructions, to receive paint finish specified in Section 09 9000, Painting.

3.11 WATER RESISTANT SEALANT

- A. Apply a continuous bead of water resistant sealant around cutouts at raw edges and at penetrations of water-resistant gypsum board and glass-mat water resistant tile backer board.

3.12 GYPSUM BOARD SURFACE TEXTURE

- A. Spray-apply texture compound to produce a fine-spray texture finish in accordance with approved mock-up.
- B. Apply texture compound only after gypsum board joints are taped and dry, and after painter-applied surface primer specified in Section 09 9000, Painting, is applied and dry.

C. Gypsum Board Surface Texture Schedule:

1. Walls: Smooth.
2. Ceilings: Smooth.

3.13 REPAIRS

- A. Repair screw pops by installing new screw approximately 1-1/2 inches away from projecting screw and reset projecting screw if face paper is fractured, remove projecting screw, fill damaged surface and finish flush and smooth.
- B. Fill cracks; finish flush and smooth.

3.14 CLEANING UP

- A. Clean exposed surfaces affected by work of this Section, and repair imperfections in finish.

- B. In addition to other requirements for cleaning, use necessary care to prevent scattering gypsum board scraps and dust, and to prevent tracking gypsum and joint finishing compound onto floor surfaces.
- C. Remove scrap, debris, and surplus material of this Section at completion of each segment of installation and dispose of in legal manner.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Ceramic tile.
2. Uncoupling, Crack Isolation, and Waterproof membrane for floor tile installations.

B. Related Sections:

1. Section 03 3000: Cast-In-Place Concrete, for floor substrate.
2. Section 07 9200: Joint Sealants.
3. Section 09 2900: Gypsum Board, for glass-mat, water-resistant backer board.

1.2 SUBMITTALS

A. Product Data: Submit for each type of product specified, including installation and maintenance instructions.

B. Samples for Verification:

1. Two full size samples of each type, color and finish of tile required.
2. Two samples of grout for color selection by Architect.

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain each of the following products specified through one source from a single manufacturer for each product:

1. Joint sealants.
2. Waterproofing / crack isolation / uncoupling membrane.

B. Mock-Up:

1. Install 10 square feet of floor tile with joints grouted.
2. Install 10 square feet of wall tile with joints grouted.
3. Architect will review for correct joint size, profile, and color.
4. Approved mock-up may become part of the finished Work.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store package materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling sealed tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location. Protect from freezing.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.6 EXTRA MATERIALS

- A. Furnish quantity of full size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by one of the manufacturers specified:

1. Tile as indicated for each designation in the Finish Legend in Drawings.
2. Mortar and Grout Materials:
 - a. Bostik Chemical Group
 - b. C-Cure Chemical Company
 - c. Custom Building Products
 - d. Laticrete International, Inc.
 - e. Mapei Corporation
 - f. Summitville.
3. Cleaning Materials:
 - a. American Olean Tile Co. Division
 - b. AquaMix, Inc.
 - c. Hillyard Chemical Co.
 - d. National Gypsum Co.

- B. Substitutions: Submit according to requirements of Section 01 2500.

2.2 PRODUCTS - GENERAL

- A. Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements, unless otherwise indicated.

- B. Standards for Tile Installation Materials: Provide materials complying with ANSI standards indicated in this Specification.

2.3 TILE PRODUCTS

- A. Tile: Subject to compliance with requirements, provide products indicated for each designation in the Finish Legend in Drawings.

2.4 UNCOUPLING / CRACK ISOLATION / WATERPROOFING MEMBRANE MATERIALS

- A. Provide materials complying with requirements of ANSI A118.10 for waterproof membranes, ANSI A118.12 for crack isolation membranes, and manufacturer's proprietary uncoupling system allowing independent movement between tile and substrate and to limit transfer of stresses, as defined by TCNA for Uncoupling Membrane.

B. Uncoupling / Crack Isolation Sheet Waterproofing for Thin-Set Applications:

1. Acceptable Products:
 - a. The Noble Company; NobleSeal (DalSeal) TS.
 - b. Schluter Systems: Schluter-Ditra.

2.5 MORTAR SETTING AND GROUTING MATERIALS

- A. Latex-Portland Cement Mortar (Thin Set): ANSI A 118.4, consisting of prepackaged dry-mortar mix combined with liquid-latex additive.
 1. Wall Applications: Provide nonsagging mortar that complies with Paragraph C-4.6.1 in addition to the other requirements in ANSI A 118.4.
- B. Latex-Portland Cement Grout: ANSI A188.6/A118.7 with liquid-latex form for addition to prepackaged dry-grout mix, color as selected.
- C. Liquid-Latex Admixtures:
 1. Mortar Latex Admixture:
 - a. Bostic: Hydroment Flex-A-Lastic Latex Additive.
 - b. Laticrete: Laticrete 3701 Mortar Admix.
 - c. Mapei: Planicrete 50.
 - d. Summitville: S-800 Setting Acrylic Latex Additive
 2. Grout Latex Admixture:
 - a. Bostic: Hydroment 425 Multi-Purpose Acrylic Latex Additive.
 - b. Laticrete: Laticrete 3701 or Laticrete 1776 Grout Admix Plus.
 - c. Summitville: S-775 Grouting Acrylic Latex Additive.

2.6 TILE BACKER UNITS

- A. Glass-Mat, Water-Resistant Backer Board: As specified in Section 09 2900.
 1. ASTM C 1178, 5/8 inches thick; Fire retardant Type X.
 2. Product: "DensShield Fireguard Tile Guard" by G-P Gypsum, a Georgia-Pacific Company.

2.7 TILE ACCESSORIES

- A. Sealant: Interior nonacid silicone rubber sealant, types as specified in Section 07 9200.
- B. Leveling and Patching Compounds: Ardex SD-P Instant Patch or Ardex SD-F Feather Finish, as applicable, or approved.
- C. Self-Leveling Underlayment: Ardex SD-L Self-Drying / Self-Leveling Underlayment Concrete.
- D. Rubber Accessory Moldings:
 1. Color and Pattern: As selected by Architect from manufacturer's full range of colors.

- E. Grout Sealer: Manufacturer's penetrating product for sealing grout joints that does not change color or appearance of grout.
 - 1. Bostik; CeramaSeal Magic Seal.
 - 2. Custom Building Products; Surfaceguard Sealer.
 - 3. Mapei Corporation; Penetrating Sealer for Unglazed Grout and Tile.
 - 4. Summitville Tiles, Inc; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.

2.8 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
 - 1. Add materials, water, and additives in accurate proportions

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify substrates, areas, and conditions where tile will be installed comply with requirements for installation tolerances and other conditions affecting performance of installed tile.
 - 1. Verify substrates are firm, dry, clean, free of oil, waxy films, and curing compounds.
 - 2. Verify flatness of floor slab does not exceed 1/4 inch in 10 feet and 1/16 inch in one foot, noncumulative, in all directions for thin set tile.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and level concrete substrates as recommended in referenced ANSI A 108 Series of tile installation standards.
- B. Floor Flatness: Use trowelable leveling and patching compounds to fill cracks, holes and depressions in substrates, including open joints, and to align substrates with adjacent surfaces.
 - 1. Build-up and feather out leveling compound a minimum of 4 feet from adjacent floor surfaces to achieve alignment of top of finish flooring surfaces.
 - 2. Level subfloor to achieve flatness of 1/4 inch in 10 feet and 1/16 inch in one foot, noncumulative, in all directions for thin set tile.
 - 3. Sand or grind protrusions, bumps and ridges.

3.3 INSTALLATION - GENERAL

- A. General:
 - 1. Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and methods indicated.
 - 2. Comply with latest edition of TCNA's (Tile Council of North America, Inc.) "Handbook for Ceramic Tile Installation" guidelines for TCNA installation methods indicated.
 - 3. Comply with mortar and grout manufacturer's printed instructions.
- B. Joints:
 - 1. Lay tile in grid pattern, unless otherwise indicated in Drawings, with aligned joints.
 - 2. Lay out tile work and center tile fields in both directions in each space or wall area.

3. Provide uniform joints, adjusted to minimize tile cutting.
4. Align joints when adjoining tiles on floor, base, walls, and trim are the same size.
5. Install sealant at joints between tile and plumbing fixtures; comply with requirements of Section 07 9200, Joint Sealants.

3.4 FLOOR TILE INSTALLATION

- A. Floor Tile – Interior Installation on Wood with Waterproof Membrane, Crack Isolation, and Uncoupling System (Thin-Set):
1. Comply with TCNA F147; ANSI A108.5 and ANSI A108.10 and manufacturer's instructions for uncoupling membrane.
 2. Apply uncoupling, crack isolation, waterproofing membrane over wood substrate with bond coat.
 3. Install tile with latex portland cement mortar bond coat.
 4. Install tile with latex-portland cement grout.
- B. Floor Tile – Interior Installation on Concrete [Slab-On-Grade] (Thin-Set):
1. Comply with TCNA F113; ANSI A108.5 and ANSI A108.10.
 2. Install tile with latex portland cement mortar bond coat.
 3. Install tile with latex-portland cement grout.
- C. Rubber Accessory Moldings: Install at locations indicated, or where exposed edge of tile meets carpet, wood, or other flooring except tile.
- D. Grout Sealer: Apply penetrating grout sealer to grout joints according to manufacturer's instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer that has gotten on tile faces by wiping with soft cloth.

3.5 WALL TILE INSTALLATION

- A. Wall Tile – Interior Installation on Coated Glass Mat Backer Board (Thin-Set)
1. Comply with TCNA W245; ANSI A108.5 and ANSI A108.10.
 2. Install tile with latex portland cement mortar bond coat.
 3. Install tile with latex-portland cement grout.

3.6 ADJUSTING AND CLEANING

- A. Adjusting Defective Work:
1. Replace cracked, chipped, broken, and unbonded tile.
 2. Rake and regrout defective grout joints.
- B. Final Cleaning:
1. Clean tile and joints with Tile Cleaner after curing mortar and grout.
 2. Rinse with clean water and allow to dry.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sheet flooring.
2. Resilient wall base.

B. Related Sections:

1. Section 01 4500: Quality Control, for moisture vapor emission testing for concrete slabs-on-grade.
2. Section 03 3000: Cast-In-Place Concrete, for substrate affecting work of this Section.
5. Section 09 6800: Carpet, for resilient accessory requirements.

1.2 SUBMITTALS

A. Product Data: For each type of product specified.

B. Shop Drawings: Show location of seams and edges. Indicate location of columns, doorways, built-in cabinets, and cutout locations.

C. Samples: 12 inch by 12 inch for each type, color, and pattern of resilient flooring product specified, and 12 inch length for each type and color of wall base and accessory.

D. Maintenance Data: For resilient floor coverings to include in maintenance manuals.

1.3 QUALITY ASSURANCE

A. Comply with applicable requirements of Resilient Floor Covering Institute: "Standard Specifications and Recommended Work Procedures of Resilient Floor Coverings."

B. Installer: Engage installer who is approved by manufacturer and has successfully completed 5 projects of similar size, quality and complexity.

C. Coordinate with other trades to assure proper interface with work of this Section.

1.4 REGULATORY REQUIREMENTS

A. Comply with regulations of governmental authorities having jurisdiction concerning use of products with Volatile Organic Compounds (VOCs).

B. Fire-Test-Response Characteristics: Provide products complying with the following tests:

1. ASTM E 648: Critical Radiant Flux; 0.45 W/sq. cm. or greater.
2. ASTM E 662: Smoke Density; maximum specific optical density of 450 or less.

C. Fire Test Response Characteristics: Provide floor covering materials in exits and in accesses to exits complying with the following in accordance with NFPA 101:

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm per ASTM E 648.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver in unopened packages with Manufacturer's original, legible labels intact.

- B. Maintain packaged materials with seals unbroken and labels intact until time of use, and manufacturer's run number for matching floor coverings.
- C. Store off ground, in dry spaces protected from weather and damage.
- D. Store rolls upright.

1.6 PROJECT CONDITIONS

- A. Do not start installation of resilient floorings until permanent HVAC system is in complete operation.
 - 1. Maintain temperatures within range recommended by manufacturer, but not less than 70 degrees F or more than 95 degrees F for 48 hours before installation, during installation, and 48 hours after installation.
- B. Close spaces to traffic for 48 hours after floor covering installation.
- C. Install resilient floor coverings after other finishing operations, including painting, have been completed.
- D. Do not install resilient floor coverings over concrete slabs until concrete has cured and is sufficiently dry to bond with adhesive, as determined by floor covering manufacturer's recommended bond and moisture tests for the following.
 - 1. Subfloor Moisture Conditions: Maximum moisture emission rate of 3 lb of water/1000 sq. ft. in 24 hours when tested by calcium chloride moisture test in accordance with ASTM F 1869, unless otherwise recommended by flooring manufacturer for specific products.
 - 2. Subfloor Alkalinity Conditions: A pH range of 5 to 9 when subfloor is wetted with potable water and pHydration paper is applied.
 - 3. Conduct tests by an independent testing agency, engaged by the Owner, under provisions of Section 01 4500.
- E. Coordination: Coordinate with work of other Sections that require resilient floor accessories.

1.7 FIELD MEASUREMENTS

- A. Field verify dimensions prior to installation; if differing substantially from Drawings, or approved Shop Drawings, obtain Architect's approval before proceeding.

1.8 EXTRA MATERIALS

- A. Furnish extra stock of each type, color, and pattern of floor covering installed, as follows:
 - 1. Tile: Furnish 1 box for every 50 boxes or fraction thereof installed.
 - 2. Sheet: Furnish 10 linear feet for every 500 linear feet or fraction thereof, in roll form and in full roll width, of floor covering installed.
- B. Furnish extra stock of not less than 10 linear feet for every 500 linear feet of each type, color, and size of resilient accessory installed.
- C. Package each type of material separately, identified, and protected against deterioration.
- D. Deliver to on-site location designated by Owner.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide products indicated for each designation in the Resilient Floor Covering Schedule at the end of PART 3.

2.2 SHEET FLOOR COVERINGS

- A. Unbacked Sheet Vinyl Floor Coverings: Provide products complying with ASTM F 1913, Type II, Grade 1, and with requirements specified in the Finish Legend in Drawings.

2.3 RESILIENT ACCESSORIES

A. Resilient Wall Base:

1. Provide products complying with ASTM 1861, Type TP, (Rubber, Thermoplastic) and with requirements specified in the Finish Legend in Drawings.
2. Style:
 - a. Style A, Straight with no toe at carpet.
 - b. Style B, Cove, topset with toe at other locations.
3. Minimum Thickness: 1/8 inch.
4. Length: Continuous.

- B. Rubber Stair Treads, Risers, and Stringers: Provide products of style suitable for use indicated and complying with FS RR-T-650, Composition A, and with requirements specified in the Finish Legend in Drawings.

1. Riser and Stringer Thickness: 0.125 inch.

- C. Rubber Accessory Moldings: Provide products with requirements specified in the Rubber Accessory Moldings Schedule at the end of PART 3.

2.4 INSTALLATION ACCESSORIES

A. Leveling and Patching Compounds:

1. Ardex SD-P Instant Patch or Ardex SD-F Feather Finish, as applicable,
2. Armstrong Latex Underlayment S-183 or S-184 as applicable.

- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

1. Products: Use W. W. Henry Company "Henry GreenLine" adhesives for low emissions and odor.
2. Solid Vinyl Adhesive: Toli 900 solvent free epoxy adhesive.

- C. Concrete Slab Primer: Non-staining.

- D. Heat-Welding Bead: Solid strand product of floor covering manufacturer for heat-welding seams.

- E. Cove Strip: 1 inch radius support for integral cove base provided or approved by floor covering manufacturer.

- F. Cove Base Cap Strip: Square metal, vinyl, or rubber cap for integral cove base provided or approved by floor covering manufacturer.
- G. Rubber Edge Strips:
 - 1. Size: One inch wide, beveled, matching flooring thickness.
 - 2. Color: As selected from standard range.
- H. Sealant:
 - 1. Manufacturer: Dow Corning, General Electric, or approved.
 - 2. Type: ASTM C-920, Type S, Class 25, Grade NS; Clear, translucent silicone with mildew inhibitor.
- I. Cleaners: Neutral type provided or approved by floor covering manufacturer.
- J. Stair-Tread-Nose Filler: Two-part epoxy compound recommended by resilient tread manufacturer to fill nosing substrates that do not conform to tread contours.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and surface conditions for compliance with requirements for installation tolerance, moisture content, and other conditions affecting performance.
 - 1. Verify that concrete floor slabs are dry and free of curing compounds, sealers, hardeners, foreign deposits, and other materials that may interfere with adhesive bond.
 - 2. Verify that concrete slabs have cured for minimum of 28 days prior to application of resilient floor coverings.
 - 3. Verify moisture vapor emission tests have been performed for concrete substrates.
 - 4. Verify that concrete floor slab finish complies with requirements specified in Section 03 3000 for slabs receiving resilient floor coverings, and with warranty requirements of Vapor Emission Control System specified in Section 03300.
 - 5. Verify that subfloors are free of cracks, ridges, and depressions, and that open joints have been filled.
 - 6. Verify that substrate is smooth and level, with flatness not exceeding 3/16 inch in 10 ft., noncumulative, in all directions.
 - 7. Verify that bottom of wall surfaces to receive base are within 1/4 inch from top of floor.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with resilient floor covering manufacturer's installation instructions for preparing substrates to receive resilient floor products.
 - 1. Prepare concrete substrates according to ASTM F 710.
 - 2. Prepare concrete substrates in accordance with warranty requirements of Vapor Emission Control System.
- B. Use trowelable leveling and patching compounds to fill cracks, holes and depressions in substrates, including open joints, and to align substrates with adjacent surfaces.
 - 1. Build-up and feather out leveling compound a minimum of 4 feet from adjacent floor surfaces to achieve alignment of top of finish flooring surfaces.

2. Level subfloor to achieve flatness of 3/16 inch in 10 feet, noncumulative, in all directions.
 3. Sand or grind protrusions, bumps and ridges.
- C. Remove coatings and other substances that are incompatible with resilient products, using mechanical methods recommended by manufacturer. Do not use solvents.
 - D. Broom clean and vacuum surfaces to be covered.
 - E. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
 - F. Priming: Apply concrete slab primer as recommended by resilient flooring manufacturer, in accordance with manufacturer's instructions.

3.3 SHEET VINYL INSTALLATION

- A. Comply with sheet vinyl floor covering manufacturer's installation instructions.
- B. Unroll sheet vinyl floor coverings and allow them to stabilize before cutting and fitting.
- C. Maintain uniformity of floor covering direction.
- D. Lay out to achieve a minimum number of seams; place in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in floor covering substrates.
- E. Match edges for color shading and pattern at seams.
- F. Scribe and cut floor covering to butt neatly and tightly to vertical surfaces, permanent fixtures, and around pipes and penetrations.
- G. Extend floor covering into door reveals, toe spaces, closets, under saddles and recesses, and similar openings.
- H. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish floorings as marked on subfloor. Use chalk or other nonpermanent, nonstaining, marking device.
- I. Adhere sheet floor covering to floor substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising or puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- J. Form integral cove base with sheet floor covering, of height indicated, at vertical surfaces, where indicated. Support at juncture of horizontal and vertical surfaces with cove strip. Terminate top of coved base with a cap strip.
- K. Heat-Welded Seams: Rout joints and heat weld with welding bead, permanently fusing sections into a seamless floor covering. Prepare, weld, and finish seams according to manufacturer's instructions and ASTM F 1516.
- L. At horizontal unprotected edges, unless otherwise noted, place resilient reducer strips tightly butted to units and secured with adhesive; where reducer strip occurs at doorway, center strip under door.

3.4 RESILIENT WALL BASE INSTALLATION

- A. Install resilient products according to manufacturer's installation instructions.

- B. Apply wall base to walls, columns, wall projections, casework and cabinet toe spaces, and other permanent fixtures, in rooms and areas where base is required.
- C. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Where applied on irregular substrates, fill voids along top edge of wall base with manufacturer's adhesive filler material.
- E. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- F. Job-Formed Corners:
 - 1. Outside Corners: Form from straight pieces of maximum lengths possible, without whitening at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
 - 2. Inside Corners: Form from straight pieces of maximum lengths possible, by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.
 - 3. Set toe of base in continuous bead of sealant. Remove excess sealant from exposed surfaces.

3.5 RESILIENT ACCESSORIES INSTALLATION

- A. Resilient Stair Accessories:
 - 1. Scribe stringers to fit stair profile and align top with top of wall base. Shape top edge to match top edge of base.
 - 2. Tightly adhere to substrates throughout length of each piece.
 - 3. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
- B. Resilient Molding Accessories:
 - 1. Butt to adjacent materials and tightly adhere to substrates throughout length of each piece.
 - 2. Install reducer strips at edges of floor coverings that would otherwise be exposed.

3.6 CLEANING AND PROTECTION

- A. Perform the following immediately after completing resilient product installation:
 - 1. Remove excess adhesive and other residue from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- B. Protect resilient products against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- C. If recommended in writing by floor covering manufacturer for specific products installed, apply protective floor polish, using commercially available product recommended by floor covering manufacturer, and coordinated with Owner's maintenance service.

- D. Cover floor coverings with undyed, untreated building paper until Substantial Completion.
- E. Clean floor coverings just before scheduled inspection for Substantial Completion.
- F. Do not move heavy and sharp object directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved.

3.8 RUBBER ACCESSORY MOLDINGS SCHEDULE

- A. Rubber Accessory Moldings:
 - 1. Product Description:
 - a. Reducer strip for resilient flooring.
 - b. Carpet edge for glue-down applications.
 - c. Carpet nosing.
 - d. Tile and carpet joiner.
 - e. Cap for coved sheet floor covering.
 - 2. Color and Pattern: As selected by Architect from manufacturer's full range of colors.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Linoleum sheet flooring.
2. Linoleum tile flooring.

B. Related Sections:

1. Section 01 4500: Quality Control, for moisture vapor emission testing for concrete slabs-on-grade.
2. Section 03 3000: Cast-In-Place Concrete, for substrate affecting work of this Section.
3. Section 09 6500: Resilient Flooring

1.2 SUBMITTALS

A. Product Data: For each type of product specified.

B. Shop Drawings: Show location of seams and edges. Indicate location of columns, doorways, built-in cabinets, and cutouts.

C. Samples: 12 by 12 inches for each type, color, and pattern specified.

1. For heat-welding bead, not less than 12 inches long of each color specified.

D. Heat-Welded Seam Samples: Of each heat-welding bead and flooring product, color, and pattern combination required, with seam running lengthwise and in center of a 12 by 12 inch sample made and applied to a rigid backing by installer for this project.

E. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.

F. Maintenance Data: For linoleum floor coverings to include in maintenance manuals.

1.3 QUALITY ASSURANCE

A. Comply with applicable requirements of Resilient Floor Covering Institute: "Standard Specifications and Recommended Work Procedures of Resilient Floor Coverings."

B. Installer: Engage installer who is approved by manufacturer, in writing, is competent in technique required for heat-welded seams, and has successfully completed five projects of similar size, quality and complexity.

C. Coordinate with other trades to assure proper interface with work of this Section.

D. Mockups: Before installing linoleum floor coverings, construct mockups for each type of linoleum floor covering and installation method required to demonstrate aesthetic effects and qualities of materials and execution. Comply with the following requirements, using materials specified for completed work:

1. Locate mockups where directed by Architect.
2. Notify Architect 7 days in advance of date and time mockups will be constructed.
3. Obtain Architect's approval of mockups before starting the work.

4. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed work.
 - a. When directed, demolish and remove mockups from project site.
 - b. Approved mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed work.

1.4 REGULATORY REQUIREMENTS

- A. Comply with regulations of governmental authorities having jurisdiction concerning use of products with Volatile Organic Compounds (VOCs).
- B. Fire-Test-Response Characteristics: Provide products complying with the following tests:
 1. ASTM E 648: Critical Radiant Flux; 0.45 W/sq. cm. or greater.
 2. ASTM E 662: Smoke Density; maximum specific optical density of 450 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver in manufacturer's original, unopened packages with labels intact and legible.
- B. Store products in dry spaces protected from weather with ambient temperatures maintained between 50 and 90 degrees F.
- C. Store tiles on flat surfaces.
- D. Store rolls upright.

1.6 ENVIRONMENTAL CONDITIONS

- A. Do not start installation of linoleum floor coverings until permanent HVAC system is in complete operation.
- B. Move linoleum floor coverings and related products into spaces where they will be installed at least 72 hours in advance of installation.
- C. Do not install linoleum floor coverings until they are the same temperature as the space where they are to be installed.
- D. Install linoleum floor coverings after other finishing operations have been completed.
- E. Do not install linoleum floor coverings over concrete slabs until concrete has cured and is sufficiently dry to bond with adhesive, as determined by floor covering manufacturer's recommended bond and moisture test.
 1. Subfloor Moisture Conditions: Maximum moisture emission rate of 3 lb of water/1000 sq. ft. in 24 hours when tested by calcium chloride moisture test in accordance with ASTM F 1869, unless otherwise recommended by flooring manufacturer for specific products.
 2. Subfloor Alkalinity Conditions: A pH range of 5 to 9 when subfloor is wetted with potable water and pHdrion paper is applied.
 3. Conduct tests by an independent testing agency, engaged by the Owner, under provisions of Section 01 4500.

1.7 FIELD MEASUREMENTS

- A. Field verify dimensions prior to installation; if differing substantially from Drawings, or approved Shop Drawings, obtain Architect's approval before proceeding.

1.8 EXTRA MATERIALS

- A. Furnish extra stock of each type, color, and pattern of floor covering installed as follows:
 - 1. Furnish one box minimum for each type of vinyl composition tile installed.
 - 2. Furnish not less than 10 linear feet in roll form for every 500 linear feet of linoleum sheet flooring installed.
- B. Package each type of material separately, identified, and protected against deterioration.
- C. Deliver to on-site location designated by Owner.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products of manufacturers indicated for each designation in the Finish Legend in Drawings.

2.2 LINOLEUM FLOOR COVERINGS

- A. Consisting of oxidized linseed or other vegetable drying oil and rosin, mixed with ground cork or wood flour, mineral filler, and pigments. Mixture is bonded and keyed to a burlap (jute) or other suitable fibrous backing so that backing is partially embedded in mixture. Patterns and colors extend through entire floor covering thickness.

2.3 INSTALLATION ACCESSORIES

- A. Leveling and Patching Compounds:
 - 1. Ardex SD-P Instant Patch or Ardex SD-F Feather Finish, as applicable,
 - 2. Armstrong Latex Underlayment S-183 or S-184 as applicable.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit floor covering and substrate conditions indicated.
- C. Heat-Welding Bead: Solid strand product of floor covering manufacturer for heat-welding seams.
- D. Cove Strip: 1 inch radius support for integral cove base provided or approved by floor covering manufacturer.
- E. Cove Base Cap Strip: Square metal, vinyl, or rubber cap for integral cove base provided or approved by floor covering manufacturer.
- F. Prefabricated Flash Cover Base: Floor covering manufacturer's standard prefabricated units matching floor covering specified.
- G. Rubber Accessory Moldings: Specified in Section 09 6513.
- H. Cleaners: Neutral type provided or approved by floor covering manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and surface conditions where installation of linoleum floor coverings will occur.
 - 1. Verify that substrates and conditions are satisfactory for installation and meet requirements specified.
 - a. Verify that concrete floor slabs comply with ASTM F 710.
 - b. Verify that concrete floor slabs are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Perform moisture and pH tests.
 - c. Verify that concrete floor slab finish complies with requirements specified in Section 03 3000 for slabs receiving resilient floor coverings.
 - d. Verify that subfloors are free of cracks, ridges, depressions, and foreign deposits.
 - e. Verify that substrate is smooth, level, and without more than 1/8 inch 10 ft. variation from level or slopes.
 - f. Verify that bottom of wall surfaces to receive base are within 1/4 inch from top of floor.
 - 2. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. General: Comply with resilient floor covering manufacturer's installation instructions for preparing substrates to receive linoleum floor coverings.
- B. Use trowelable leveling and patching compounds to fill cracks, holes and depressions in substrates, and to align substrates with adjacent surfaces.
 - 1. Build-up and feather out leveling compound a minimum of 4 feet from adjacent floor surfaces to achieve alignment of top of finish flooring surfaces.
- C. Remove coatings and other substances that are incompatible with flooring adhesives, using mechanical methods recommended by manufacturer. Do not use solvents.
- D. Broom clean and vacuum surfaces to be covered.

3.3 FLOOR COVERING INSTALLATION, GENERAL

- A. Comply with linoleum floor covering manufacturer's installation instructions.
- B. Scribe, cut and fit flooring neatly and tightly to vertical surfaces, and around pipes and penetrations.
- C. Extend flooring into recesses such as door reveals and toe spaces, closets, under saddles and recesses, and similar openings.
- D. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish floorings as marked on subfloor. Use chalk or other nonpermanent, nonstaining marking device.
- E. Adhere sheet floor covering to floor substrates in accordance with manufacturer's installation instructions.

- F. At horizontal unprotected edges, unless otherwise noted, place resilient reducer strips tightly butted to units and secured with adhesive; where reducer strip occurs at doorway, center strip under door.

3.4 SHEET FLOORING INSTALLATION

- A. Lay out sheet flooring to maintain uniformity of covering direction.
- B. Lay out to achieve a minimum number of seams, and place in inconspicuous and low-traffic areas, not less than 6 inches from parallel joints in flooring substrates.
- C. Match edges for color shading and pattern at seams according to manufacturer's instructions.
- D. Avoid cross and abutt seams.
- E. Integral Flash Cove Base: Where indicated, cut sheet flooring to form integral base of height indicated at vertical surfaces. Support at juncture of horizontal and vertical surfaces with cove strip. Terminate top of coved base with a cap strip.
- E. Prefabricated Flash Cove Base: Install according to manufacturer's written instructions.
- F. Heat-Welded Seams: Rout joints and heat weld with welding bead, permanently fusing sections into a seamless floor covering. Prepare, weld, and finish seams according to manufacturer's instructions and ASTM F 1516.
- G. Hand roll sheet floor coverings in both directions from center out to embed in adhesive and eliminate trapped air.

3.5 TILE FLOORING INSTALLATION

- A. Comply with tile manufacturer's installation instructions.
- B. Lay out tiles from center marks established with principal walls, discounting minor offsets, so that units at opposite edges of room are of equal width.
 - 1. Adjust as necessary to avoid use of cut widths less than 3 inches wide at room perimeters.
 - 2. Lay units square to axes of room or space.
 - 3. At corridors, provide full tile for pattern centered on corridor width.
 - 4. Match units for color and pattern by using materials from cartons in same sequence as manufactured and packaged.
 - 5. Lay tile in a basket weave with grain direction alternating in adjacent tiles.
 - 6. Lay tile in pattern of colors and sizes indicated in Drawings.
- C. Hand roll tiles according to tile manufacturer's instructions.

3.6 CLEANING AND PROTECTING

- A. Remove excess adhesive and other residue from exposed surfaces using neutral cleaner recommended by manufacturer of resilient materials.
- B. Clean floor surfaces as recommended by linoleum floor covering manufacturer.

- C. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by floor covering manufacturer.
 - 1. Apply protective floor polish to floor surfaces that are free from soil, adhesive, and surface blemishes.
 - a. Seal linoleum with not less than 3 coats of floor polish.
 - b. Use commercially available product acceptable to floor covering manufacturer.
 - c. Coordinate selection of floor polish with Owner's maintenance service.
 - 2. After drying room film (yellow film caused by linseed oil oxidation) disappears, cover linoleum floor coverings with non-dyed untreated building paper until inspection for Substantial Completion.
 - 3. Do not move heavy and sharp objects directly over floor surfaces. Place plywood or hardboard panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.
- D. Clean floor coverings not more than 4 days before scheduled inspection for Substantial Completion. Clean floor coverings according to floor covering manufacturer's written instructions.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes carpet tile.
- B. Related Sections:
 - 1. Section 01 4500: Quality Control, for moisture vapor emission testing for concrete slabs-on-grade.
 - 2. Section 03 3000: Cast-In-Place Concrete, for substrate affecting work of this Section.
 - 3. Section 09 6513: Resilient Base and Accessories: Resilient wall base and accessories.

1.2 SUBMITTALS

- A. Product data and manufacturer's specifications for each type of carpet tile material and accessory required.
 - 1. Include installation methods for carpet tile on each type of substrate.
- B. Shop Drawings showing columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet. Indicate the following:
 - 1. Carpet tile type, color, dye lot, and where dye lot changes occur.
 - 2. Type of subfloor and installation method.
 - 3. Pattern layout and starting point.
 - 4. Pile direction.
 - 5. Type, color, and location of inserts and borders.
 - 6. Type, color, and location of edge, transition, and other accessory strips, including transition details to other materials.
- C. Samples for verification, from same material to be used in the work:
 - 1. Two full size samples of each type and color of carpet tile specified.
 - 2. 12-inch samples of each type of exposed edge stripping and accessory item.
- D. Schedule of carpet using same room number designations indicated in Drawings.
- E. Maintenance Data: Methods for maintaining carpet tile, including cleaning and stain removal products and procedures.

1.3 QUALITY ASSURANCE

- A. Provide carpet tile that comply with Department of Commerce Flammability Standard CO FF 1-70, ASTM D 1335 and ASTM D 2859.
 - 1. Carpet in Exitways: Comply with requirements of National Bureau of Standards Radiant Panel Test 75-950.
 - 2. Surface Flammability: Passes CPSC 16 CFR, Part 1630.
- B. Provide carpet tile that comply with ASTM E 84 Test for Surface Burning Characteristics of Building Materials for the following ratings:
 - 1. Flame spread: 25 or less.
 - 2. Smoke density: 450 or less.

- C. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm per ASTM E 648.
- D. Electrical Resistance: Meet requirements of AATC 134 Electrostatic Propensity of Carpet.
- E. Provide carpet of each color/pattern from same dye lot.
- F. Coordinate wWork of this Section to interface with work of other trades.

1.4 REGULATORY REQUIREMENTS

- A. Comply with regulations of governmental authorities having jurisdiction concerning use of materials with Volatile Organic Compounds (VOCs).

1.5 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with the Carpet and Rugs Institute's CRI 104, Section 5: "Storage and Handling."
- B. Deliver materials in original unbroken mill wrapping, with manufacturer's register number labels intact. Labels to include identification of manufacturer, brand name and lot number.
- C. Store in an area protected from weather and damage in a well-ventilated area.

1.6 PROJECT CONDITIONS

- A. General: Comply with CRI 104, Section 7.2: "Site Conditions; Temperature and Humidity."
- B. Do not install carpet tile until space is enclosed and weatherproof, nominally dry, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.
- C. Do not install carpet tile over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive, as determined by carpet tile manufacturer's recommended bond and moisture test.
 - 1. Subfloor Moisture Conditions: Maximum moisture emission rate of 3 lb of water/1000 sq. ft. in 24 hours when tested by calcium chloride moisture test in accordance with ASTM F 1869.
 - 2. Subfloor Alkalinity Conditions: A pH range of 5 to 9 when subfloor is wetted with potable water and pHydron paper is applied.
 - 3. Conduct tests by an independent testing agency, engaged by the Owner, under provisions of Section 01 4500.

1.7 FIELD MEASUREMENTS

- A. Field verify dimensions prior to installation; If differing significantly from Drawings, or approved Shop Drawings, obtain Architect's approval before proceeding.

1.8 WARRANTY

- A. Provide the following warranties:
 - 1. 5 year warranty that carpet shall maintain specified limits of static electricity generating.
 - 2. 10 year warranty that carpet shall not lose more than 10 percent of face fiber by weight.

3. 10 year warranty that carpet shall not delaminate from substrate, curl, cup, shrink, or deteriorate at edges.

1.9 EXTRA MATERIALS

- A. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type, color and pattern indicated, but not less than 10 sq. yd.

PART 2 PRODUCTS

2.1 CARPET TILE

- A. Products: Subject to compliance with requirements, provide products indicated for each designation in the Finish Legend in Drawings.

2.2 ACCESSORIES

- A. Concrete Slab Primer: Nonstaining type as recommended by carpet tile manufacturer.
- B. Leveling and Patching Compounds:
 1. Ardex SD-P Instant Patch or Ardex SD-F Feather Finish, as applicable,
 2. Armstrong Latex Underlayment S-183 or S-184 as applicable.
- C. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated and to comply with flammability requirements for installed carpet as recommended by the carpet tile manufacturer.
- E. Resilient Edge Strips: Product types to suit application specified in Section 09 6513, of maximum lengths to minimize running joints.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and surface conditions for compliance with requirements for installation tolerance, moisture content, and other conditions affecting performance.
 1. Verify that concrete floor slabs comply with ASTM F 710.
 2. Verify that concrete floor slabs are dry and free of curing compounds, sealers, hardeners, foreign deposits, and other materials that may interfere with adhesive bond.
 3. Verify that concrete slabs have cured for minimum of 28 days prior to application of resilient floor coverings.
 4. Verify moisture vapor emission tests have been performed for concrete substrates.
 5. Verify that concrete floor slab finish complies with requirements specified in Section 03 3000 for slabs receiving resilient floor coverings, and with warranty requirements of Vapor Emission Control System specified in Section 03 3000.
 6. Verify that subfloors are free of cracks, ridges, and depressions, and that open joints have been filled.
 7. Verify that substrate is smooth and level, with flatness not exceeding 3/16 inch in 10 ft., noncumulative, in all directions.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI 104, Section 7.3, "Site Conditions; Floor Preparation," and carpet manufacturer's installation instructions for preparing substrates to receive carpet.
 - 1. Prepare concrete substrates according to ASTM F 710.
- B. Use trowelable leveling and patching compounds to fill cracks, holes and depressions in substrates, and to align substrates with adjacent surfaces.
 - 1. Build-up and feather out leveling compound a minimum of 4 feet from adjacent floor surfaces to achieve alignment of top of finish flooring surfaces.
 - 2. Level subfloor to achieve flatness of 3/16 inch in 10 feet, noncumulative, in all directions.
 - 3. Sand or grind protrusions, bumps and ridges.
- C. Remove coatings and other substances that are incompatible with resilient products, using mechanical methods recommended by manufacturer. Do not use solvents.
- D. Broom clean and vacuum surfaces to be covered.

3.3 INSTALLATION

- A. General: Comply with CRI 104, Section 13: "Carpet Modules."
- B. Installation Method: Glue-down; install every tile with releasable adhesive.
 - 1. Install carpet tile only after finishing operations, including painting, have been completed.
 - 2. Install carpet tile with pile inclination in one direction.
 - 3. Scribe carpet tiles accurately at edges and fit neatly into breaks and recesses, against bases, around pipes and penetrations, under saddles and thresholds, and around permanent cabinets and equipment.
 - 4. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves and similar openings.
 - 5. Install pattern parallel to walls and borders.
- C. Where demountable partitions or other items are indicated for installation on top of finished carpet tile floor, install carpet tile before installation of these items.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
 - 2. Remove yarns that protrude from carpet surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet to comply with CRI 104, Section 16, "Protecting Indoor Installations."

- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by carpet manufacturer.
 - 1. Provide heavy non-staining paper or plastic walkways over carpet tile in direction of traffic, maintaining intact in carpeted space until Substantial Completion.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Acoustical insulation.
2. Acoustical sealant.

B. Related Sections:

1. Section 07 2100: Building Insulation, for thermal insulation.
2. Section 09 2900: Gypsum Board, for installation of acoustical sealant.

1.2 PRODUCTS SUPPLIED BUT NOT INSTALLED UNDER THIS SECTION

- A. Acoustical blanket insulation and acoustical sealant in partitions is installed under provisions of Section 09 2900, Gypsum Board.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide with material of this Section a continuous acoustic barrier at interior partitions where indicated in the Drawings when used in conjunction with materials specified in Section 09 2900, Gypsum Board.

1.4 SUBMITTALS

- A. Certified test reports showing compliance with required fire performance values.

1.5 QUALITY ASSURANCE

- A. Use workers who are trained and experienced in necessary crafts and familiar with requirements and methods needed for proper performance of work of this section.

- B. Surface Burning Characteristics: When tested in accordance with ASTM E 84.

1. Flame Spread: No greater than 25.
2. Smoke Developed: No greater than 50.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources.

- B. Store inside and in a dry location.

- C. Comply with manufacturer's instructions for handling, storing, and protecting during installation.

PART 2 PRODUCTS

2.1 ACOUSTICAL INSULATION

- A. ASTM C 665, Type I, preformed glass-fiber or mineral wool type, unfaced; minimum 3/4 to 1 lb/cu ft. density.

B. Acceptable Products:

1. Owens Corning: Sound Attenuation Batt Insulation.
2. Johns Manville: Sound Control Batts.

C. Minimum Thickness:

1. Walls: 3 inches.

2.2 SEALANTS

A. Acoustic Sealant: Non-hardening, non-drying, permanently flexible, for use in conjunction with gypsum board conforming to ASTM D 217.

1. Exposed and Concealed Joints:

- a. ChemRex, Inc., Contech Brands; PL Acoustical Sealant.
- b. Pecora; AC-20 Acoustical and Insulation Sealant.
- c. U.S. Gypsum; "Sheetrock" Acoustical Sealant.

2. Concealed Joints:

- a. Miracle; 21
- b. Pecora; BA 98 Acoustical Sealant.
- c. Tremco, Inc.; Tremco Acoustical Sealant.

B. Fire-Rated Acoustic Sealant: Single component, silicone penetration sealant capable of stopping passage of fire, smoke, and water when tested in accordance with ASTM E 814 and UL 1479, and capable of reducing sound transmission when tested in accordance with ASTM E 413; Dow Corning; Fire Stop Sealant.

PART 3 EXECUTION

3.1 PREPARATION

A. Coordinate as required with other trades to assure proper and adequate provision in work of this Section.

3.2 INSTALLATION

A. Acoustical or Sound Partitions:

1. At walls with acoustical blanket insulation, comply with ASTM C 919 for application of acoustical sealant.
2. Apply fire-rated sealant at all fire rated walls with acoustical batt insulation.

B. At a minimum, install acoustical sealant at gypsum board perimeter as follows:

1. Metal Framing: One bead.
2. Base gypsum board layer.
3. Face gypsum board layer.

C. Apply a continuous bead of sealant behind board edges and press back of board into sealant.

D. Apply acoustical sealant around penetrations, such as electrical boxes, pipes, and other items penetrating partitions.

- E. Provide sealant full depth of gypsum board facings; skim coat not allowed.
- F. Use fire-resistant acoustical sealant at all fire-rated acoustical walls.
- G. Refer to Section 09 2900 for installation of blanket acoustical insulation and acoustical sealant in partitions.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and application of paints and coatings.
- B. Related Sections:
 - 1. Sections where factory preparation, priming, or priming and finishing, of painted or finished surfaces is specified.
 - 2. Section 09 2900: Gypsum Board, for substrate.
 - 3. Division 22: Plumbing, for painting of plumbing work.
 - 4. Division 23: Heating Ventilating, and Air Conditioning, for painting of HVAC work.
 - 5. Division 26: Electrical, for painting of electrical work.

1.2 WORK NOT INCLUDED

- A. Unless otherwise indicated, painting is not required on surfaces in concealed areas and inaccessible areas such as furred spaces, foundation spaces, utility tunnels, pipe spaces, and duct shafts.
- B. Metal surfaces of anodized or painted aluminum, stainless steel, chromium plate, copper, bronze, and similar finished materials shall not require painting under this Section, unless otherwise noted.
- C. Do not paint moving parts of operating units; mechanical or electrical parts such as valve operators; linkages; sensing devices; and motor shafts.
- D. Do not paint required labels or equipment identification, performance rating, name, or nomenclature plates.
- E. Do not paint gypsum board walls above suspended ceilings.

1.3 REFERENCES

- A. The Master Painters Institute (MPI): Approved Product List, Latest Edition.

1.4 DEFINITIONS

- A. "Paint", as included herein, means coating, systems materials including primers, emulsions, epoxy, stained enamels, sealers, fillers, and other applied materials whether used as primer, intermediate, or finish coats.
- B. Gloss/Sheen Parameter (Reflectance based off 60 degree angle reading) based on MPI (Master Painters Institute):
 - 1. Gloss Level 1: Maximum 5 units. Flat matte finish
 - 2. Gloss Level 2: Maximum 10 units. Flat, high side sheen; velvet-like finish
 - 3. Gloss Level 3: 10-25 units. Eggshell-like finish
 - 4. Gloss Level 4: 20-35 units. Satin-like finish
 - 5. Gloss Level 5: 35-70 units. Semi-gloss
 - 6. Gloss Level 6: 70-85 units. Gloss
 - 7. Gloss Level 7: More than 85 units. High gloss

1.5 SUBMITTALS

A. Product Data:

1. Materials list of required coating materials. Identify each material by manufacturer's catalog number, general classification, and cross-reference with finish system and application.
2. Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.

B. Samples:

1. Stepped Samples, defining each separate coat, of each color and material to be applied.
 - a. Provide three Samples of each drawdown, approximately 8 x 10 inches in size, each marked with specified color designation.
 - b. If requested by Architect, submit samples during construction representative samples of the actual substrate.
2. Revise and resubmit Samples as requested until required sheen, color, and texture is achieved. Approved Samples become standards of color and finish for accepting or rejecting Work of this Section.
3. Do not commence painting until approved Samples are on file at job site.

C. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

1.6 QUALITY ASSURANCE

A. Use skilled workers who are trained and experienced in crafts and familiar with requirements and methods needed for proper performance of Work of this Section.

B. Provide Work in conformance with recommendations in the "Architectural Painting Specification Manual" by The Master Painters Institute (MPI).

C. Mock-up: Provide a full-coat benchmark finish sample of each type of coating and substrate required on the Project, where directed by Architect, and where permanent lighting has been activated.

1. Walls and Ceilings: Provide samples on a minimum of 100 sq. ft.
2. Doors and Frames: One door and frame at exterior steel and interior locations.
3. Approved mock-ups will be used as standard for Work of this Section.
4. Approved mock-ups may be used as part of the finished Work.

1.7 REGULATORY REQUIREMENTS

A. Provide products that comply with local regulations controlling use of volatile organic compounds (VOCs).

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver in manufacturer's original, unopened containers with legible labels intact.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum temperature of 45 degrees F.

1.9 PROJECT CONDITIONS

- A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90 degrees F.
- B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95 degrees F.
- C. Use low temperature paint products equal to specified products, as approved, for applications when air temperatures are below 50 degrees F.
- D. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or to damp or wet surfaces.
 - 1. Applications may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by the paint manufacturer as being suitable during application and drying periods.

1.10 EXTRA MATERIALS

- A. Furnish and deliver to the Owner extra paint materials from the same production run as the materials applied equaling 5 percent, but not less than one gallon or more than 5 gallons, of each material, color, and gloss applied.
 - 1. Package paint materials in unopened, factory-sealed containers for storage, clearly labeled describing contents and location where used.

PART 2 PRODUCTS

2.1 ACCEPTABLE PRODUCTS

- A. Subject to compliance with requirements, provide products listed in the Finish Legend in Drawings.
- B. Other products listed in the MPI (Master Painters Institute) Approved Product List, latest edition, are acceptable, subject to compliance with requirements and approval. Submit according to requirements of Section 01 2500; include paint manufacturers statement that proposed substitution is equal or superior to product listed.

2.2 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide fillers, primers, undercoats, and finish coat materials that are compatible with one another and the substrates indicated under service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Undercoats and Thinners:
 - 1. Provide undercoat paint produced by same manufacturer as finish coat.
 - 2. Use only thinners recommended by paint manufacturer, and use only to recommended limits.
 - 3. Insofar as practicable, use undercoat, finish coat, and thinner material as parts of a unified system of paint finish, except where material is factory primed.
 - 4. Where accent colors are scheduled or indicated, provide appropriate and sufficient undercoats accordingly.
- C. Colors: Match colors indicated by reference to manufacturer's color designations.

2.3 APPLICATION EQUIPMENT

- A. For application of paint materials, use only such equipment as is recommended for application of particular paint by manufacturer of that paint, and as approved by Architect.
- B. Prior to use of application equipment, verify proposed equipment is compatible with material to be applied, and integrity of finish will not be jeopardized by use of proposed equipment.

2.4 OTHER MATERIALS

- A. Provide other materials required for a complete and proper installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements.
 - 1. Do not proceed with application of paint until unsatisfactory conditions have been corrected and surfaces are receiving paint are thoroughly dry.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates.
 - 1. Provide barrier coats over non-compatible primers, or remove primer and reprime as required to achieve compatibility with finish coatings.
 - 2. Notify the Architect in writing of anticipated problems using materials specified over substrates primed by others.

3.2 PREPARATION

- A. General:
 - 1. Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to painted. If removal is impractical or impossible, provide surface-applied protection prior to surface preparation and painting.
 - 2. After completion of painting operations in each space or area, reinstall removed items by using workers who are skilled in trades involved.
- B. Cleaning and Preparation:
 - 1. Clean and prepare surfaces to be painted in strict accordance with paint manufacturer's recommendations for each substrate condition, and as specified.
 - 2. Remove oil and grease with clean cloths and cleaning solvent of low toxicity and flash point in excess of 200 degrees F, prior to start of mechanical cleaning.
 - 3. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall onto wet painted surfaces.
- C. Preparation of Wood Surfaces:
 - 1. Clean surfaces until free from dirt, oil, and other foreign substances.
 - 2. Smooth finished surfaces exposed to view with sandpaper.
 - 3. Do not proceed with painting of wood surfaces until the moisture content of the wood is 12 percent or less as measured by a moisture meter.

D. Preparation of Metal Surfaces:

1. Ungalvanized, Uncoated Surfaces: Clean surfaces until free from dirt, oil, and grease, and loose mill scale.
 - a. Blast steel surfaces clean as recommended by paint system manufacturer and according to requirements of Steel Structures Painting Council (SSPC) SP 10.
 - b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
2. Ungalvanized, Coated Surfaces: Clean surfaces until free from dirt, oil, and grease, and touch up bare areas and shop applied prime coats that have been damaged. Touch up with the same primer as the shop coat.
3. Galvanized surfaces: Remove oil and surface contaminants with nonpetroleum-based solvents. Use mechanical methods to remove pretreatment from galvanized sheet metal fabricated from coil stock.

E. Materials Preparation:

1. Mix and prepare paint materials in accordance with manufacturers' instructions.
2. When materials are not in use, store in tightly covered containers.
3. Maintain containers used in storage, mixing, and application of paint in a clean condition, free from foreign materials and residue.
4. Stir materials before application, producing a mixture of uniform density.
 - a. Do not stir surface film into material; remove surface film and, if necessary, strain material before using.

3.3 APPLICATION

A. General:

1. Apply paint materials in accordance with manufacturers and referenced standard's recommended installation procedures.
2. Tint undercoats to match the color of the finish coat, but provide a lighter shade in each undercoat to distinguish each separate coat.
3. Sand and dust between coats to remove defects visible to unaided eye from a distance of five feet.
4. On removable panels and hinged panels, paint backsides to match exposed faces.
5. Sand lightly between each succeeding enamel or varnish coat.
6. Omit primer on metal surfaces that have been shop primed and touch up painted.
7. Apply additional coats where undercoats, stains, or other conditions show through the final coat of paint, until paint finish is uniform in color, appearance, and opacity.

B. Drying:

1. Allow sufficient drying time between coats, modifying period as recommended by material manufacturer to suit weather conditions.
2. Consider oil-base and oleo-resinous solvent-type paint as dry for recoating when paint feels firm, does not deform or feel sticky under moderate pressure of thumb, and when application of another coat of paint does not cause lifting or loss of adhesion of undercoat.

C. Brush Applications:

1. Brush out and work brush coats onto surface in an even film.

2. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, and other surface imperfections to be repaired.

D. Spray Application:

1. Where spray application is used, apply each coat to provide hiding equivalent of brush coats.
2. Do not double back with spray equipment to build up film thickness of two coats in one pass.

E. For completed Work, match approved Samples as to texture, color, sheen.

1. Remove, refinish, or repaint work not in compliance with specified requirements.

F. Minimum Coating Thickness: Provide the total dry film thickness of the entire system specified, but in no case less than recommended by the manufacturer.

G. Miscellaneous surfaces and procedures:

1. Exposed Mechanical Items:

- a. Finish electric panels, access doors, conduits, plug mold, pipes, ducts, grilles, registers, vents, and items of similar nature to match the adjacent wall and ceiling surfaces in finished spaces.
- b. Paint visible duct surfaces behind vents, registers, and grilles flat black.
- c. Wash galvanized metal with solvent, prime, and apply 2 coats of specified enamel.

2. Hardware:

- a. Paint prime coated hardware to match adjacent surfaces.
- b. Paint metal portions of head seals, jamb seals, and astragal seals to match color of door frame, unless otherwise directed by Architect.

3. Wet Areas (Toilet Rooms, Showers, Kitchens, Janitors, and the Like):

- a. Add an approved fungicide to paint.
- b. For oil base paints, use 1 percent phenylmercuric or 4 percent tetrachlorophenol.
- c. For water emulsion and glue size-sized surfaces, use 4 percent sodium tetrachloropenate.

4. Exposed Vents: Apply two coats of heat-resistant paint.

5. Plywood at Walls for Mounting Electric, Telephone and Data Equipment: Paint gray or blue as directed by Owner.

3.4 FIELD QUALITY CONTROL

- A. The Owner reserves the right to engage an independent testing agency to sample the paint material being applied, and test for minimum coating thickness.
- B. Samples of material delivered to the Project will be taken, identified, sealed, and certified in the presence of the Contractor.

- C. The Owner may direct the Contractor to stop painting if test results show material being used does not comply with specification requirements.
 - 1. The Contractor shall pay for testing, and repaint surfaces found to be coated with noncomplying paints. If the noncomplying paints are incompatible with specified paints, the Contractor may be required to remove noncomplying paint from painted surfaces.

3.5 CLEANING

- A. Remove from the site each day, empty cans, rags, rubbish, and other discarded refuse created by Work of this Section, and dispose of in a legal manner.
 - 1. Do not dump waste materials, including thinners, on site.
 - 2. Do not use sanitary or storm drains.

3.6 PROTECTION

- A. Protect Work of other trades against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- B. Provide "Wet Paint" signs at newly painted finishes.
- C. Touch up and restore damaged or defaced painted surfaces caused by other trades.

3.7 EXTERIOR PAINT SCHEDULE

- A. Provide minimum dry mil thickness of 3 mils, but in no case less than recommended by paint manufacturer, or as otherwise noted.
- B. Provide gloss/sheen indicated in this schedule unless otherwise indicated in Color Schedule.
- C. Use low temperature paint products equal to specified products, as approved, for applications when air temperatures are below 50 degrees F.
- D. Paint products followed with an * are acceptable products not MPI listed.
- E. Primer: Wood - Opaque Finish:
 - 1. First Coat: Exterior Latex Wood Primer MPI #6

Benjamin Moore: Fresh Start All-Purpose 100% Acrylic Primer 023-00.
ICI Dulux: Dulux Professional Exterior 100% Acrylic Primer 2000-1200.
Kelly-Moore: Stain Lock 11 Stain Resistant Acrylic Primer 255-100.
Miller Paint Co: Acri-Lite Primer 7052.
PPG: Seal Grip Interior/Exterior Latex Stain Blocking Primer 17-921.
Rodda Paint Co: First Coat Exterior Interior Latex Primer 50 1601 1.
Sherwin Williams: A-100 Exterior Latex Wood Primer B42W41.

F. Primer: Fiber-Cement Siding; Delete if siding is preprimed:

1. First Coat: 100 percent Acrylic Primer:

Benjamin Moore: Fresh Start All-Purpose 100% Acrylic Prime 023.
ICI Dulux: Dulux Professional Exterior 100% Acrylic Primer 2000-1200.
Kelly-Moore: Chem-Guard Acrylic Masonry Primer 247.*
Miller Paint Co: Kril Primer Sealer 6040.*
Rodda Paint Co: First Coat Exterior Interior Latex Primer 50 1601 1.
Sherwin Williams: Loxon Acrylic Masonry Primer A24W300.*

G. Primer: Gypsum Board Soffits:

1. First Coat: Alkyd or Acrylic primer sealer, as indicated.

Benjamin Moore: Moorcraft Super Spec Alkyd Exterior Primer 176.
ICI Dulux: Dulux Professional Exterior 100% Acrylic Primer 2000-1200.
Miller Paint Co: Kril Primer Sealer 6040.
Rodda Paint Co: Multi Prime Exterior Interior Acrylic Primer 505901x.
Sherwin Williams: A-100 Exterior Oil Wood Primer Y24W20.

H. Primer: Ferrous Metal:

1. First Coat: Rust Inhibitive Primer (Water Based) MPI #107.

Benjamin Moore: Acrylic Metal Primer M04.
ICI Dulux: Devflex DTM Flat Interior/Exterior W.B. Primer 4020.
Kelly-Moore: DTM Acrylic Metal Primer 5725.
Miller Paint Co: Acrimetal Primer-Finish White 5000.
PPG: Pitt-Tech Interior/Exterior Primer/Finish DTM Ind. Enamel 90-712.
Rodda Paint Co: Professional Maintenance Metal Master Primer 508901x.
Sherwin Williams: Industrial & Marine DTM Acrylic Primer/Finish B66W1.

I. Primer and Pretreatment: Galvanized Metal:

1. Pretreatment (Metal Conditioner): Clean and acid etch.

Keeler and Long 6235.
Oakite 33.
Porter 571.
ZRC Metal Conditioner.

2. First Coat: Galvanized Primer (Water Based) MPI #134.

Benjamin Moore: Alkyd Metal Primer M04.*
ICI Dulux: Devoe Coatings Devflex WB DTM Primer Finish 4020.
Kelly-Moore: Kel Guard Galvanized Iron Primer 1725.
Miller Paint Co: Acrimetal Primer-Finish White 5000.
PPG: Interior/Exterior WB Industrial Primer 90-712 EP200608.
Rodda Paint Co: Professional Maintenance Metal Master Primer 508901x.*
Sherwin Williams: Industrial & Marine DTM Acrylic Primer/Finish B66W1.

J. Primer: Aluminum – Mill Finish:

1. First Coat: Vinyl Wash Primer MPI #80.

Miller Paint Co: Vinyl Wash Coat Primer 9172.
PPG: Polyclutch Vinyl Wash Primer 97-687.
Rodda Paint Co: Professional Maintenance Vinyl Wash Coat 709700X.
Sherwin Williams: Industrial & Marine Wash Primer P60G2/R7J44.

K. Finish Coats: Wood with Opaque Finish and Fiber-Cement Siding:

1. Second and Third Coats: Exterior Latex Flat MPI #10.

Benjamin Moore: Moorcraft Super Spec 100% Acrylic Exterior Flat 183-01.
ICI Dulux: Dulux Professional Exterior 100% Acrylic Flat Finish 2200-0100.
Kelly-Moore: Acry-Shield Exterior Flat Acrylic Finish 1240.
Miller Paint Co: Kril Coat 5900.
PPG: Sun-Proof Exterior Flat Latex 72-110.
Rodda Paint Co: Velvet Flat Exterior Latex House Paint 511101X.
Sherwin Williams: A-100 Exterior Latex Flat A6W16.

2. MPI Gloss Level 1: Flat; maximum gloss of 5 units at 60 degrees.

L. Finish Coats: Ferrous and Galvanized Metals:

1. Second and Third Coats: Exterior Latex Semi-Gloss MPI #11

Benjamin Moore: MoorGlo Acrylic Latex House & Trim Paint 096.*
ICI Dulux: Dulux Professional Exterior 100% Acrylic Semi-Gloss 2406-0110.
Kelly-Moore: Acry-Lustre Exterior Semi-Gloss Acrylic Finish 1250-121.
Miller Paint Co: Acry-Lite Semi-Gloss 7500.*
PPG: S/G Latex House Paint 78-45.
Rodda Paint Co: Unique II Semi-Gloss Exterior Latex Enamel 54 2001 1.
Sherwin Williams: A-100 Exterior Gloss Latex A8W16.

2. MPI Gloss Level 5: Semi-Gloss; gloss of 35-70 units at 60 degrees.

M. Finish Coat: Gypsum Board Soffits:

1. Second and Third Coats: Exterior Latex Flat MPI #10

Benjamin Moore: Moorcraft Super Spec 100% Acrylic Exterior Flat 183-01.
ICI Dulux: Dulux Professional Exterior 100% Acrylic Flat Finish 2200-0100.
Kelly-Moore: Acry-Shield Exterior Flat Acrylic Finish 1240.
Miller Paint Co: Kril Coat 5900.
PPG: Sun-Proof Exterior Flat Latex 72-110.
Rodda Paint Co: Velvet Flat Exterior Latex House Paint 511101X.
Sherwin Williams: A-100 Exterior Latex Flat A6W16.

2. MPI Gloss Level 1: Flat; maximum gloss of 5 units at 60 degrees.

3.8 INTERIOR PAINT SCHEDULE

- A. Provide minimum dry mil thickness of 3 mils, but in no case less than recommended by paint Manufacturer, or as otherwise noted.
- B. Provide gloss/sheen indicated in this schedule unless otherwise shown in Color Schedule.

- C. Paint products followed with an * are acceptable products not MPI listed.
- D. Primer: Wood - Opaque Finish:
1. First coat: Acrylic Primer Sealer MPI #39.

Benjamin Moore: Fresh Start Interior/Exterior Primer 023.
ICI Dulux: Prep-N-Prime 100% Acrylic Latex Primer 2000-1200.
Kelly-Moore: Uni-Prime 295.
Miller Paint Co: PPG Seal-Grip Interior/Exterior Stain Blocking Primer 17-21.
Rodda Paint Co: Unique II 100% Acrylic Enamel Undercoat 502001.
Sherwin Williams: PrepRite ProBlock Interior/Exterior Primer/Sealer B51W20.
- E. Primer: Gypsum Board:
1. First coat: Interior Latex Primer Sealer MPI #50.

Benjamin Moore: Regal First Coat Latex Primer/Undercoater & Primer Sealer 216.
ICI Dulux: Prep-N-Prime PVA Interior Wall Primer Sealer 1030-1200.
Kelly-Moore: Enviro-Cote Interior Latex Primer 1505.
Miller Paint Co: MPI #50 Primer Low Sheen.
PPG: Speedhide Interior Latex Primer Sealer 6-2.
Rodda Paint Co: Roseal Interior Latex Wallboard Sealer 507701.
Sherwin Williams: Quali-Kote Interior Latex Primer B28WB1;B28WQ8001.
- F. Primer: Ferrous Metal: Same as specified for exterior applications.
- G. Primer and Pretreatment: Galvanized Metal: Same as specified for exterior applications.
- H. Primer: Aluminum – Mill Finish: Same as specified for exterior applications.
- I. Finish Coats: Gypsum Board – Dry Areas: (Acrylic)
1. Second and Third Coats: Interior Latex Eggshell MPI #52

Benjamin Moore: Regal Aquavelvet Interior Latex Eggshell 319-01.
ICI Dulux: Ralph Lauren Interior Satin Exceptional Quality Acrylic Latex RL3291.
Kelly-Moore: Envior-Cotel Interior Acrylic Eggshell Enamel 1510-121.
Miller Paint Co: MPI #52 'Eggshell-Like' MPI #52.
PPG: Speedhide Interior Satin Acrylic Latex 6-3511.
Rodda Paint Co: Interior Eggshell Finish 333644.*
Sherwin Williams: MPI 52 Gloss level 3 Interior Latex Eg-Shel B20W8521.
 2. MPI Gloss Level 3: 'Eggshell-like' finish; gloss of 10-25 units at 60 degrees.
- J. Finish Coats: Wood with Opaque Finish: (Acrylic)
1. Second and Third Coats: Interior Latex Satin MPI #43

Benjamin Moore: Regal Interior 100% Acrylic Pearl Finish W310-01.
ICI Dulux: Dulux Interior Low Lustre Latex 1433-0100.
Kelly-Moore: Acry-Plex Acrylic Satin Enamel A1640-121.
Miller Paint Co: Acrinamel Satin 7100.
PPG: Pure Performance Interior Semi-gloss Latex 9-500.*
Rodda Paint: Master Painter Satin-White 33579.
Sherwin Williams: ProMar 200 Interior Latex Semi-Gloss B31W2251.

2. MPI Gloss Level 4: 'Satin-like' finish; gloss of 20-35 units at 60 degrees.

K. Finish Coats: Gypsum Board – Wet Areas, Ferrous and Galvanized Metals: (Acrylic)

1. Second and Third Coats: Interior Latex Semi-Gloss MPI #54

Benjamin Moore: Regal Premium 100% Acrylic Semi-Gloss Finish W333-01.
ICI Dulux: Ralph Lauren Interior S.G. Exceptional Quality Acrylic Latex RL3391.
Kelly-Moore: Enviro-Cote Interior Latex Semi-Gloss 1520.
Miller Paint Co: MPI #54 Semi-Gloss MPI #54.
Rodda Paint Co: Master Painter Interior Latex Semi-Gloss 54 3101 1.
Sherwin Williams: Quali-Kote Interior Semi-Gloss Latex A26WQ815,A26WB0151.

2. MPI Gloss Level 5: Semi-Gloss; gloss of 35-70 units at 60 degrees.

3.9 PAINT AND COLOR SCHEDULE

A. Provide gloss/sheen indicated in the Finish Legend in Drawings meeting parameters of gloss/sheen indicated in Paragraph 1.4B, of products, or equivalent products, specified in Paint Schedules above.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Disabled parking signs.
2. Interior code compliant signs.

B. Related Sections:

1. Section 03 3000: Cast-in-Place Concrete, for post mounted sign footings.
2. Section 09 2900: Gypsum Board, for gypsum board wall substrate.
3. Section 32 1724: Painted Pavement Markings

1.2 SUBMITTALS

A. Shop Drawings: Indicate sign styles, lettering font, foreground and background colors, locations, overall dimensions of each sign, and mounting heights.

1. Provide message list for each sign.
2. Provide setting drawings, templates, and directions for installation.

B. Manufacturer's Installation Instructions: Include installation template and attachment devices.

1.3 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. For each separate sign type required, obtain signs from one source of a single manufacturer.

1.4 REGULATORY REQUIREMENTS

A. Comply with The Americans with Disabilities Act (ADA), and State Building Code for accessibility recommendations and requirements for the physically disabled.

PART 2 PRODUCTS

2.1 DISABLED PARKING SIGNS

A. Provide metal disabled parking signs with night reflective surfacing, with the international symbol of accessibility and letters on sign that state "Disabled Parking."

1. Sign size shall have a width-to-height ratio between 3:5 and 1:1, and a stroke width-to-height ratio between 1:5 and 1:10.

B. Provide color contrasting characters and symbols with light characters on dark background.

C. Mount signs on a galvanized metal support pole at minimum height of 4'-6" above concrete sidewalk.

1. Verify height with local jurisdiction.

D. Accessories: Mounting Hardware; galvanized screws and anchor bolts.

2.2 CODE COMPLIANT SIGNS

- A. Type: Manufacturer's standard tactile signage series, employing Manufacturer's graphic blast process.
- B. Materials: Manufacturer's standard ES plastic high-pressure laminate. 1/8 inch thick, fire-retardant, self-extinguishing.
- C. Style: Signs shall be of the four-in-one construction style having the following characteristics:
 - 1. Tactile Characters/Symbols: Raised 1/32 inch from sign plate face.
 - 2. Grade 2 Braille.
 - 3. Provide letters, numbers, symbols, and Braille contrasting with their background, and in compliance with Chapters 10 and 11 of the State Building Code based on current edition of the International Building Code.
- D. Lettering Style: Helvetica Medium, uppercase.
- E. Lettering Size: Comply with Chapter 10 of the State Building Code based on current edition of the International Building Code.
- F. Layout: Center lettering on sign face with Braille message below.
- G. Size: Vary sign size with regard to message. Provide a 1 inch wide border on all sides of message area.
- H. Mounting:
 - 1. Attach to wall surface with Manufacturer's standard general purpose adhesive.
 - 2. Height: Mount signs at 60 inches above finished floor to centerline of sign.
 - a. Verify height with local jurisdiction.
 - 3. Location:
 - a. Single-Swing Doors: Sign edge 6 inch from strike jamb.
 - b. Double-Swing Doors: Sign edge 6 inch from right-hand jamb.
 - c. No Door: As directed by Architect.
- I. Signs:
 - 1. Toilet Room Identification Signage: Self adhering black plastic sign with white international symbol for male and female, of same size, type, and color as room sign.
 - 2. Provide code required signs at all locations in compliance with Chapters 10 and 11 of the State Building Code based on current edition of the International Building Code.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Beginning of installation means installer accepts existing surfaces.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions and in compliance with The Americans with Disabilities Act (ADA).
- B. Install signs after doors and wall surfaces are finished, in locations indicated.
- C. Center parking signs on parking space.

3.3 CLEANING

- A. Clean exposed surfaces of signs.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes plastic-laminate-clad toilet compartments and urinal screens:
 - 1. Compartment Style: Floor mounted.
 - 2. Urinal Screen Style: Wall mounted.
- B. Related Sections:
 - 1. Section 06 1000: Rough Carpentry, for wall framing, blocking and support backing.
 - 2. Section 10 8100: Toilet Accessories, for toilet accessories mounted in Work of this Section.

1.2 SUBMITTALS

- A. Product Data, for each type and style of toilet compartment and urinal screen specified.
 - 1. Include details of construction details, material description, fabrication, and installation requirements.
 - 2. Include details of anchors, hardware, and fastenings.
- B. Shop Drawings, showing fabrication and dimensional installation of toilet compartment assemblies.
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Show locations of reinforcement and cutouts for compartment-mounted toilet accessories.
 - 3. Show layout of toilet compartments in relationship to entire room including fixtures and counters.
 - a. Show and indicate that clearances to walls and fixtures are in compliance with Chapter 11 of the State of Oregon Structural Specialties Code for accessibility requirements for the physically disabled.
- C. Samples: Of each compartment color and finish required, prepared on 6-inch-square Samples of same thickness and material indicated.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Use skilled workers trained and experienced in necessary crafts and familiar with requirements and methods needed for proper performance of Work of this Section.
- B. Comply with requirements in GSA's CID-A-A-60003, "Partitions, Toilets, Complete."

1.4 REGULATORY REQUIREMENTS

- A. Comply with Chapter 11 of the State of Oregon Structural Specialties Code for accessibility requirements for the physically disabled.

1.5 FIELD MEASUREMENTS

- A. Verify actual locations of walls, columns, ceiling, and other construction in areas of installation by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Where field measurements cannot be made before fabrication without delaying the Work, establish dimensions and coordinate wall, floor, ceiling and other construction to ensure that actual dimensions correspond to established dimensions.

1.6 COORDINATION

- A. Coordinate with other trades to assure proper and adequate provision in work of those trades for interface with work of this Section.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products from one of the following:
 - 1. Sanymetal
 - 2. Bobrick
 - 3. Global.
- B. Substitutions: Submit in accordance with requirements of Section 01 2500.

2.2 MATERIALS

- A. Plastic Laminate: NEMA LD 3, HGS, 0.048 inch nominal thickness.
 - 1. Colors and Patterns: Selected from manufacturer's full range or colors and patterns.
- B. Door, Panel, and Pilaster Construction: Plastic laminate facing sheets pressure laminated to core material without splices or joints in facings or cores. Edges laminated before broad surfaces to seal edges and prevent laminate from being pried loose. Seal exposed core material at cutouts to protect core from moisture.
 - 1. Core Material: ANSI 208.1, Grade M-2 particleboard with 45 pound density, made with binder containing no urea formaldehyde.
 - 2. Thickness: Finished to not less than 1 inch thick.
 - 4. Pilasters: Finished to not less than 1-1/4 inch thickness, or 1 inch if internally reinforced with sheet steel.
- C. Pilaster Shoes and Sleeve Caps: Stainless steel, ASTM A 666, Type 302 or 304, not less than 0.031 inch thickness and 3 inches high, finished to match hardware.
- D. Brackets (Fittings):
 - 1. Compartment Panels: Stirrup type ear or U-brackets, stainless steel.
 - 2. Urinal Screens: Full height (continuous) type, stainless steel.

2.3 FABRICATION

- A. General: Provide units with cutouts and drilled holes to receive compartment-mounted hardware, accessories, and grab bars, as indicated

- B. Floor Mounted Compartments: Provide manufacturer's standard corrosion-resistant anchoring assemblies complete with threaded rods, lock washers, and leveling adjustment nuts at pilasters for connection to floor. Provide shoes at pilasters to conceal anchorage.
- C. Wall Mounted Urinal Screens: Provide units in sizes indicated of same construction and finish as compartment panels, unless otherwise indicated.
- D. Doors: Unless otherwise indicated, provide 24-inch-wide in-swinging doors for standard toilet compartments, and 36-inch-wide out-swinging doors with a minimum 32-inch-wide clear opening for disabled accessible compartments.
 - 1. Hinges: Manufacturer's standard self-closing type that can be adjusted to hold door open at any angle up to 90 degrees.
 - 2. Latch and Keeper: Slide bar latch with combination stop and latch keeper, designed for emergency access and complying with disabled accessibility requirements.
 - 3. Coat Hook: Combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.
 - 4. Door Bumper: Manufacturer's standard rubber-tipped bumpers at out-swinging doors.
 - 5. Door Pull: Comply with disabled accessible requirements at out-swinging doors. Provide units on both sides of doors at disabled accessible compartments.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify areas and conditions are ready to receive Work of this Section.
- B. Correct conditions detrimental to timely and proper completion of Work.

3.2 INSTALLATION

- A. Comply with manufacturer's written installation instructions and Chapter 11 of the State of Oregon Structural Specialties Code for accessibility requirements for the physically disabled.
- B. Install units rigid, straight, plumb, and level. Secure units in position with manufacturer's recommended anchoring devices.
- C. Provide clearances of not more than 1/2 inch between pilasters and panels and not more than 1 inch between panels and walls.
- D. Secure compartment panels to walls and panels with not less than three brackets attached at midpoint and near top and bottom of panel.
- E. Floor Anchored Compartments: Secure pilasters to supporting structure and level, plumb, and tighten.
 - 1. Secure continuous head rail to each pilaster with not less than 2 fasteners.
- F. Hang doors and adjust so tops of doors are level with tops of pilasters when doors are in closed position.
- G. Urinal Screens: Secure panels to walls with continuous wall bracket system full length of panel. Set units level and plumb and to resist lateral impact.

3.3 ADJUSTING AND CLEANING

- A. Adjust and lubricate hardware according to manufacturers written instructions for proper operation.
- B. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched.
- C. Set hinges on out-swinging doors and swing doors in entrance screens to return to fully closed position.
- D. Provide final protection and maintain conditions that ensure toilet compartments and screens are without damage or deterioration at the time of Substantial Completion.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes toilet room accessories.
- B. Related Sections:
 - 1. Section 06 1000: Rough Carpentry, for wood blocking and support backing for wall mounted accessories.
 - 2. Section 10 2114: Plastic-Laminate-Clad Toilet Compartments, for mounting reinforcement in toilet compartments for accessories.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include the following:
 - 1. Construction details and dimensions.
 - 2. Anchoring and mounting requirements, including for cutouts in other work and substrate preparation.
 - 3. Material and finish descriptions.
 - 4. Features that will be included in Project.
 - 5. Manufacturer's warranty.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
- C. Maintenance Data: For toilet accessories to include in maintenance manuals.

1.4 REGULATORY REQUIREMENTS

- A. Comply with Chapter 11 of the State of Oregon Structural Specialties Code for accessibility requirements for the physically disabled.
 - 1. Grab Bars:
 - a. Comply with structural strength requirements for grab bars and mounting of grab bar fasteners as stated in Chapter 11 of the State of Oregon Structural Specialties Code for accessibility requirements for the physically disabled.
 - b. Coordinate placement of wall reinforcement for grab bars of sufficient length to meet the above requirements and capable of supporting at least a 250 pound point load.

1.5 COORDINATION

- A. Coordinate with placement of internal wall reinforcement, and reinforcement of toilet partitions to receive anchor attachments for work of this Section.
- B. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning and servicing of accessories.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products indicated in the Schedule of toilet accessories at the end of PART 3, as manufactured by one of the following:
1. Bobrick Washroom Equipment, Inc.
 2. American Specialties, Inc.
 3. Bradley Corporation.
 4. Gamco.
 5. McKinney/Parker.

2.2 MATERIALS

- A. Stainless Steel Sheet: ASTM A 666, Type 304, 0.0312 inch minimum nominal thickness, unless otherwise indicated.
- B. Sheet Steel: ASTM A 1008, Designation CS (cold rolled, commercial steel), 0.0359 inch minimum nominal thickness.
- C. Tubing: ASTM A 269, stainless steel.
- D. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear glass mirrors, nominal 6.0 mm thick.
- E. Fasteners, Screws, and Bolts: Stainless steel. Provide tamper and theft resistant where exposed.
- F. Expansion Shields: As recommended by manufacturer for suitable for application.

2.3 FABRICATION

- A. Weld and grind smooth joints of fabricated components.
- B. Form exposed surfaces from single sheet of stock, free of joints.
- C. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- D. Shop assemble components and package complete with anchors and fittings.
- E. Provide steel anchor plates, adapters, and anchor components for installation.

2.4 FACTORY FINISHING

- A. Stainless Steel: No. 4 satin luster finish.

2.5 LOCKS AND KEYING

- A. Provide tumbler locks for all lockable access doors and panels.
- B. Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of 6 keys to Owner.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify location and placement of internal wall reinforcement and reinforcement in toilet partitions to receive anchor attachments for work of this Section.
- B. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Install fixtures, accessories and items in accordance with manufacturer's installation instructions and Chapter 11 of the State of Oregon Structural Specialties Code for accessibility requirements for the physically disabled.
- B. Install each item in its proper location, plumb and level, securely and rigidly anchored to wall framing.

3.3 CLEANING

- A. Clean exposed surfaces.

3.4 SCHEDULE

- A. Toilet Accessories: Bobrick Washroom Equipment, Inc. products are listed as standard:

1.	TPD/SCD/SND-1	Toilet Paper/Toilet Seat/Sanitary Napkin Dispenser	B-3574
2.	TPD/SCD/SND-2	Toilet Paper/Toilet Seat/Sanitary Napkin Dispenser	B-3579
3.	TPD/SCD-1	Toilet Paper/Toilet Seat Dispenser	B-3474
4.	PTD/WR-1	Paper Towel Dispenser/Waste Receptacle	B-43944
5.	GB	Grab Bars, bar lengths as shown	B-5806 Series
6.	SD-1	Soap Dispenser	B-4112
7.	MR-1	Mirror	B-165 6030
8.	MR-2	Mirror	B-165 1830
9.	MH	Surface mounted stainless steel mop and broom holder	B-223 x 24

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes prefabricated fireplaces, including chimney flues and roof caps.
- B. Related Sections:
 - 1. Section 06 1000: Rough Carpentry, for framing.
 - 2. Section 09 3000: Tile, for hearth and surround materials.
 - 3. Division 26: Electrical, for connection to power source, and wiring and conduit not included with work of this Section.

1.2 SUBMITTALS

- A. Product Data, for each product and accessory specified in this Section, including manufacturer's recommended installation procedures.
- B. Shop Drawings: Elevations, sections, dimensions, installation clearances, anchorage and interface of work of this Section with work of adjacent trades.
- C. Operating and maintenance instructions.
- D. Evidence of compliance with certification standard, and UL listing.

1.3 QUALITY ASSURANCE

- A. Provide products with UL listing, and complying with governing codes and regulations.
 - 1. Certification Standard: ANSI Z21.50 and CGA2.22.
- B. Provide products of acceptable manufacturers that have been in satisfactory use in similar service for three years.
- C. Use skilled workers trained and experienced in necessary crafts who are familiar with requirements and methods needed for proper performance of work of this Section.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver, handle, and store materials in accordance with manufacturer's instructions.

1.5 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in work of those trades for interface with work of this Section.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Design Standard: Simplifyre by Hean-N-Glo, provide the following type, where indicated:
 - 1. Electric Type:
 - a. Model: CF550E-B,

- B. Other Acceptable Manufacturers: Subject to compliance with requirements, equivalent products from one of the following may be provided with approval:
 - 1. Majestic.
 - 2. Heatilator.
 - 3. Dimplex.

2.2 MANUFACTURED UNITS – ELECTRIC FIREPLACES

- A. Prefabricated Fireplaces:
 - 1. Type: Radiant, realistic flame image.
 - 2. Electric Characteristics:
 - a. 120 voltage.
 - b. 1000 watts.
 - c. 3500 BTU.
 - 3. Controls: Remote control.
 - 4. Construction: Sheet metal.
 - 5. Style: One-sided.
 - 6. Finish: Manufacturer's standard heat-proof matte-gloss Black Enamel.
- B. Fireplace Trim:
 - 1. Facing and Hearth: Tile specified in Section 09 3000.
 - 2. Mantel: Wood.
 - a. Design Standard: Heat-N-Glo, Berkeley Shelf, or approved.
 - 1) Size: 59 inches x 8 inches x 5 inches.
 - 2) Finish: Paint as specified in Section 09 9000.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify conditions are ready to receive work of this Section.

3.2 INSTALLATION

- A. Install materials and systems in accordance with manufacturer's instructions and approved submittals.
- B. Install materials and systems in proper relation with adjacent construction.

3.3 CLEANING, ADJUSTMENT AND PROTECTION.

- A. Repair damaged finishes.
- B. Test for proper operation.
- C. Clean and protect work from damage.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Portable fire extinguishers.
2. Cabinets for fire extinguishers.
3. Mounting brackets for fire extinguishers.

B. Related Sections:

1. Section 06 100: Rough Carpentry, for wood wall framing, blocking and support backing.

1.2 SUBMITTALS

A. Product Data, for each type product and accessory specified or required.

1. Fire Extinguishers: Include rating and classification.
2. Fire Extinguisher Cabinets: Include rough-in dimensions, mounting methods, trim style, door hardware, cabinet type, and panel style.

B. Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.3 QUALITY ASSURANCE

A. Provide extinguishers, cabinets and accessories from a single manufacturer.

B. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

C. Fire Extinguishers: Provide fire extinguishers that are UL listed and labeled for type, rating, and classification, or other independent testing agency acceptable to authorities having jurisdiction.

1.4 COORDINATION

A. Coordinate as required with other trades to assure proper and adequate provision in work of those trades for interfacing with work of this Section.

B. Coordinate size of fire extinguisher cabinets to ensure they are sized to accommodate type and capacity of extinguishers.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to Project site in Manufacturer's original containers with original labels intact and legible.

B. Store above ground, under cover and protected from damage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products from one of the following:
 - 1. J.L. Industries.
 - 2. Larsen Manufacturing.
- B. Substitutions: Submit in accordance with requirements of Section 01 2500.

2.2 FIRE EXTINGUISHERS

- A. General: Provide extinguishers of type, size, and capacity for each fire extinguisher cabinet and at other locations indicated.
- B. Mounted in Fire Extinguisher Cabinets (FEC):
 - 1. Multi-Purpose Dry Chemical Type in Steel Container: U.L. rating: 2A-10BC.
 - 2. Capacity: 5 lbs.
 - 3. Color: Red.
 - 4. Mounting: One per cabinet.

2.3 FIRE EXTINGUISHER CABINETS

- A. Construction: Manufacturer's standard box, with trim, frame, door, fire extinguisher mounting bracket, and hardware to suit cabinet indicated. Weld joints and grind smooth. Miter and weld perimeter door frames.
- B. Non-Fire rated Cabinet:
 - 1. J.L. Industries Semi-recessed: Ambassador No. 1817F12
 - 2. Larsen Manufacturing Co. Semi-recessed: Architectural Series No. 2409-R3.
- C. Mounting: Semi-recessed, with 2-1/2 inch rolled edge return trim.
- D. Materials: Steel cabinet with steel door.
 - 1. Door style: Full glass.
 - 2. Door glazing: 1/4 inch clear acrylic.
- E. Minimum inside cabinet dimensions: 9-1/2 inches wide by 24 inches high by 5 inches deep.
- F. Exterior and interior cabinet and door finish: Manufacturer's white, unless otherwise noted.

2.4 MOUNTING BRACKETS

- A. Manufacturer's standard steel, size as required for type and capacity of extinguisher indicated, in plated finish.
 - 1. Provide brackets for extinguishers located in cabinets, and on walls for extinguishers not located in cabinets.

2.5 STEEL FINISHES

- A. Factory Applied Baked Enamel Finish: Two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat, minimum dry film thickness of 2 mils.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify walls and partitions have suitable framing depth and blocking where cabinets or wall brackets will be installed.
- B. For fire-rated walls with non-fire rated cabinets, verify recess is lined with gypsum board to maintain fire-resistive rating.

3.2 INSTALLATION

- A. Install Work of this Section in accordance with regulations of governing authorities having jurisdiction and manufacturer's recommended installation procedures.
- B. Mount cabinets and wall brackets at height to comply with requirements of Chapter 11 of the State of Oregon Structural Specialties Code for accessibility requirements for the physically disabled.
- C. Location: Refer to Drawings (Fire extinguisher cabinets are designated as "FEC"), or comply with requirements of NFPA 10.
- D. Conceal fasteners wherever possible.
- E. Apply sealant between cabinet flange and wall surface.
- F. Fill and service each fire extinguisher prior to Date of Substantial Completion; attach certificate of service, including date.

3.3 CLEANING AND PROTECTION

- A. Clean exposed surfaces and cabinet interiors.
- B. Touch up marred finishes, or replace cabinets that cannot be restored to factory finished appearance. Use only materials and procedures recommended or furnished by fire extinguisher cabinet manufacturer.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes:
1. Dock bumpers.

1.2 SUBMITTALS

- A. Product Data: Include details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- B. Shop Drawings: Show details of fabrication and installation. Include plans, elevations, sections, details, and attachments to other work.
1. Provide templates for anchors and bolts anchored to permanent construction.

1.3 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in work of those trades for interface with work of this Section.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Dock Bumpers:
1. Durable Corporation.
 2. Kelly Company, Inc.
 3. Pawling Corporation; Standard Products Division.
 4. R.C. Musson Rubber Co.

2.2 DOCK BUMPERS

- A. Extruded-Rubber Bumpers:
1. Provide units of size and configuration indicated, fabricated from extruded synthetic rubber, not less than 3/4 inch thick.
 2. Furnish units with predrilled anchor holes and concealed, flat, steel mounting bar.
- B. Anchorage Devices:
1. Provide anchor bolts, nuts, washers, bolts, sleeves, and other anchorage devices as required to fasten bumpers securely in place and to suit installation type indicated.
 2. Hot-dip galvanize anchorage components.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions for compliance with requirements for installation tolerances and other conditions affecting installation of loading dock equipment.

- B. Proceed with installation of loading dock equipment only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install loading dock equipment in accordance with manufacturer's instructions.
- B. Attach dock bumpers to structure in a manner that complies with requirements indicated for spacing, arrangement, and position relative to top of platform and anchorage.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes foodservice equipment and accessories indicated in the Drawings as required for a complete and proper installation.
- B. Related Sections:
 - 1. Section 03 3000: Cast-In-Place Concrete, for equipment bases and slab depressions.
 - 2. Section 06 1000: Rough Carpentry, for wood stud wall framing, and blocking and concealed in-wall support backing.
 - 3. Section 09 3000: Tile, for floor finishes.
 - 4. Division 22: Plumbing, for service rough-ins, drain traps, vents, valve, pipes, and fittings, and other materials required to complete foodservice equipment installation.
 - 5. Division 23: Heating, Ventilating, and Air Conditioning, for supply and exhaust fans, exhaust ductwork, and other materials required to complete foodservice equipment installation.
 - 6. Division 26: Electrical, for electrical connections, wiring, disconnect switches, and other electrical materials required to complete foodservice equipment installation.

1.2 SUBMITTALS

- A. Product Data, for each type of product indicated. Include the following:
 - 1. Manufacturer's model number.
 - 2. Options, accessories, and components that will be included for Project.
 - 3. Clearance requirements for access and maintenance.
 - 4. Utility service connections for water, drainage, poser, and fuel; include rough-in dimensions.
- B. Shop Drawings: For fabricated equipment. Include plans, elevations, sections, rough-in dimensions, fabrication details, utility service requirements, and attachments to other work.
- C. Coordination Drawings: Indicate locations of foodservice equipment and connections to utilities; include clearance requirements for equipment access and maintenance; details of support for equipment; and utility service characteristics.
- D. Operation and Maintenance Data: For foodservice equipment to include in operation and maintenance manuals.
 - 1. Include list of factory authorized service agencies with their addresses and telephone numbers.
- E. Warranty: Special warranties.

1.3 QUALITY ASSURANCE

- A. NSF Standards: Provide equipment that bear NSF Certification Mark or UL Classification Mark certifying compliance with applicable NSF/ANSI standards.
- B. Installer of walk-in boxes to be approved by manufacturer.
- C. Installer for foodservice equipment shall have successfully completed 5 projects of similar size, quality and complexity.

1.4 REGULATORY REQUIREMENTS

- A. Provide electrical equipment with U.L. label for completed assembly.
- B. Install equipment to comply with the following:
 - 1. ASHRAE 15, "Safety Code for Mechanical Refrigeration."
 - 2. NFPA 54, "National Fuel Gas Code."
 - 3. NFPA 70, "National Electrical Code."
 - 4. NFPA 96, "Ventilation Control and Fire Protection of Commercial Cooking Operations."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery products to Project site in manufacturer's original containers, with labels intact and legible.
 - 1. Maintain packaged materials with seals unbroken and labels intact until time of installation.
- B. Store above ground, under cover and protected from damage.

1.6 COORDINATION

- A. Coordinate foodservice equipment layout and installation with other work and utility service connections.
- B. Coordinate size, location, and requirements of the following:
 - 1. Overhead equipment supports.
 - 2. Equipment bases.
 - 3. Floor depressions.
 - 4. Floor areas with positive slopes to drains.
 - 5. Floor sinks and drains serving foodservice equipment.

1.7 FIELD MEASUREMENTS

- A. Field Measurement: Indicate measurements in Coordination Drawings.

PART 2 PRODUCTS

2.1 FOOD SERVICES EQUIPMENT

- A. Provide equipment as indicated in Drawings.
- B. Materials:
 - 1. Stainless Steel: ASTM A 666, with No. 4 finish (directional satin finish) on exposed surfaces.
- C. Stainless Steel Countertops:
 - 1. Material: Stainless steel, Type 304, 0.0625-inch specified thickness, reinforced and sound deadened.
 - 2. Backsplash: 4 inches.
 - 3. Edge: Bullnose.

D. Stainless Steel Cabinets:

1. Body: Stainless steel, Type 430, 0.0500-inch specified thickness.
2. Doors: Hinged, stainless steel, Type 304, 0.0375-inch specified thickness.
3. Drawers: Stainless-steel front and liner.
4. Layout of cabinets indicated in Drawings.

a. Provide locks.

- E. Provide other materials, not specifically described but required for a complete and proper installation, as selected by Contractor subject to approval of Architect.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify areas and conditions are ready to receive work of this Section, and correct conditions detrimental to timely and proper completion of work.
- B. Verify concealed in-wall blocking/backing necessary for securing units has been installed and is located correctly.

3.2 INSTALLATION

- A. Install foodservice equipment level and plumb, according to manufacturer's written instructions.
- B. Connect equipment to utilities.
- C. Install equipment with access and maintenance clearances that comply with manufacturer's written instructions and requirements of authorities having jurisdiction.
- D. Install joint sealant in joints between equipment and abutting surfaces with continuous joint backing, unless otherwise indicated. Produce airtight, watertight, vermin-proof, sanitary joints.

3.3 DEMONSTRATION

- A. Upon completion of installation, put each operating component through at least 10 complete operating cycles, adjusting as needed to secure optimum operating level.
- B. Demonstrate to Owner operation and maintenance of all equipment.

3.4 CLEANING, ADJUSTMENT AND PROTECTION

- A. During warranty period, adjust moving parts to operate smoothly and quietly.
- B. Clean exposed surfaces, and repair damaged surfaces.
- C. Protect equipment from damage during remainder of the construction period.
- D. Touch-up of scratches and abrasions to be permanently and completely invisible to unaided eye from a distance of 5 feet.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Metal horizontal louver blind system.

1.2 SUBMITTALS

- A. Product Data: For each specified product.
- B. Shop Drawings: Show opening sizes, tolerances required, method of attachment, clearances, and operation, and relationship to adjoining work.
- C. Samples: Two samples of each product specified illustrating slat materials and finish, color, cord and rod type and color.

1.3 EXTRA MATERIALS

- A. Provide ten additional slats and wands for each size assembly.

PART 2 PRODUCTS

2.1 HORIZONTAL LOUVER BLINDS

- A. Products: Subject to compliance with requirements, provide horizontal louver blinds meeting requirements indicated in the Louver Blind Schedule at the end of PART 3.
- B. Louver Material: Aluminum.
- C. Controls:
 - 1. Tilt Operation: Manual with wand.
 - 2. Cord-Lock Operation: Cord lock.
 - 3. Cord Equalizers: Self-aligning to maintain horizontal louver blind position.
 - 4. Colors: As selected.
 - 5. Valance: Match color of louvers.
 - 6. Mounting: Between jambs of window openings.

2.2 FABRICATION

- A. Horizontal Louver Blinds:
 - 1. Lifting and Tilting Mechanisms: Non-corrosive, self-lubricating materials.
 - 2. Installation Fasteners: Not less than 2 fasteners per bracket, fabricated from materials non-corrosive to blind materials.
 - 3. Hold-Down Brackets: Manufacturer's standard.
- B. Fabricate blinds to fit openings with uniform edge clearance of 1/2 inch.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that concealed in-wall blocking is in place for proper anchorage of horizontal support brackets to walls and ceilings.

3.2 INSTALLATION

- A. Install louver blinds in accordance with manufacturer's written installation procedures.

3.3 CLEANING

- A. Clean exposed surfaces and protect installed louver blinds from damage.

3.4 LOUVER BLIND SCHEDULE

- A. Horizontal Louver Blind, BL-1: Where this designation is indicated, provide horizontal louver blinds complying with the following:

1. Manufacturer:
 - a. Hunter Douglas Window Fashions.
 - b. Springs Window Fashions; Bali.
2. Product: 1 inch metal mini-blind, prefinished
3. Style/color: As selected from manufacturers standard line.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes entrance floor mats.

1.2 SUBMITTALS

- A. Product Data: For each product specified in this Section.
- B. Manufacturers installation instructions.

1.3 ENVIRONMENTAL REQUIREMENTS

- A. Maintain installation area at 60 to 90 degrees F temperature and 30 to 60 percent relative humidity for 24 hours prior to and during installation of rubber carpet mats.

1.4 WARRANTY

- A. Provide manufacturer's standard one year warranty against defective materials and labor on manufacturer's standard form.

PART 2 PRODUCTS

2.1 ENTRANCE MATS

- A. Products indicated in Finish Legend in Drawings.
 - 1. Substitutions: Submit according to requirements of Section 01 2500.
- B. Accessories:
 - 1. Adhesive: As recommended by mat manufacturer.
 - 2. Adhesive Cleaning Agent: As recommended by adhesive manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions under that work of this Section will be performed.
 - 1. Correct conditions detrimental to timely and proper completion of Work.
 - 2. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's installation instructions.
- B. Maintain rolled mat material in flat position for 24 hours prior to installation.
- C. Set mats in direction indicated in Drawings.
- D. Apply adhesive and install mat.
 - 1. Provide edge as indicated in Drawings.

3.4 ADJUSTING AND CLEANING

- A. Replace defective mat carpet.
 - 1. Replace mats that are not smooth, level, and free of discoloration and defects.
- B. Remove and reapply mats which are not properly bonded to substrate.
- C. Remove excess adhesive.
- D. Clean, and protect entrance mat from damage during remainder of construction period.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes bicycle racks.
- B. Related Sections:
 - 1. Section 03300: Cast-In-Place Concrete, for mounting substrate.

1.2 SUBMITTALS

- A. Product Data: Manufacturer's published product data, including installation instructions.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to project site in manufacturer's original containers, with labels intact and legible.
- B. Store above ground, under cover and protected from damage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to requirements, provide products of one of the following:
 - 1. Brandir International
 - 2. Columbia Cascade; Cycloops
 - 3. Creative Pipe Inc.
 - 4. Huntco
 - 5. Life Rax
 - 6. The Radius Bike Rack
- B. Substitutions: Submit according to requirements of Section 01 2500.

2.2 MATERIALS

- A. Material: 2-3/8 inches OD by 2 inch ID by 1.54 inch Wall, ASTM 53 Schedule 40, Steel Pipe.
- B. Mounting: Surface mount.
- C. Finish: Manufacturer's standard factory finish, color as selected by Architect.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install work of this Section in accordance with Drawings, and manufacturer's recommended installation procedures.

3.2 CLEANING

- A. Clean exposed surfaces and repair as necessary.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. The intent of Divisions 26 and 27 Specifications and the accompanying Drawings is to provide a complete and workable facility with complete systems as shown, specified and required by applicable codes. Include all work specified in Division 16 and shown on the accompanying Drawings, including appurtenances, connections, etc., in the finished job.
- B. The Division 26 and 27 Specifications and the accompanying Drawings are complementary and what is called for by one shall be as binding as if called for by both. Items shown on the Drawings are not necessarily included in the Specifications and vice versa.
- C. Imperative language is frequently used in Division 26 and 27 Specifications. Except as otherwise specified, requirements expressed imperatively are to be performed by the Contractor.
- D. Provide complete ground systems as specified herein and shown on the Drawings. Include conduit system, transformer housings, switchboard frame and neutral bus, motors, and miscellaneous grounds required.
- E. Clearly and properly identify the complete electrical system to indicate the loads served or the function of each item of equipment connected under this work.

1.2 RELATED WORK:

- A. The General and Supplemental Conditions apply to this Division, including but not limited to:
 - 1. Drawings and Specifications.
 - 2. Public Ordinances, Permits.
 - 3. Payments and fees required by governing authorities for work included in this Division.
 - 4. Change Orders.
- B. Division 1, General Requirements apply to this Division.
- C. All Sections of Division 26 and 27 Electrical Specifications, are interrelated and shall be considered in their entirety when interpreting any material, method, or direction listed in any Section of Division 26 and 27.
- D. Where specified materials or methods exceed minimum standards allowed by applicable codes, the more stringent requirement shall apply.

1.3 APPLICABLE PUBLICATIONS:

- A. The latest adopted revisions of the publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
 - 1. International Building Code (IBC).

2. National Electrical Code (NEC).
3. National Fire Protection Association (NFPA).
4. National Electrical Manufacturers Association (NEMA).
5. National Electrical Contractors Association (NECA).
6. American National Standards Institute (ANSI).
7. Institute of Electrical and Electronic Engineers (IEEE).
8. Underwriters Laboratories (UL).
9. Federal Specifications (Fed. Spec.).
10. International Fire Code (IFC).
11. Oregon Administrative Rules (OAR).
12. Oregon Structural Specialty Code.

1.4 SITE VISITATION:

- A. The Contractor shall visit the site prior to bidding and become familiar with existing conditions and all other factors that may affect the execution of the work. Include all related costs in the initial bid proposal.

1.5 COORDINATION OF WORK:

- A. Conduct work in a manner to cooperate with all other trades for proper installation of all items of equipment. Consult the Drawings of all other trades or crafts to avoid conflicts with cabinets, counters, equipment, structural members, etc. In general, the architectural drawings govern but conflicts shall be resolved with the Architect prior to rough-in.
 - B. Verify the physical dimension of each item of electrical equipment to fit the available space. Coordination of the equipment to fit into the available space and the access routes through the construction shall be the Contractor's responsibility.
- C. Prepare detailed layout drawings for panel layouts in electric rooms or closets, utilizing dimensioned shop drawing data of equipment to be furnished. Provide additional wiring details at switchboards, motor control centers, and other areas where work is of sufficient complexity to warrant additional detailing for coordination. Submit layout drawings for approval prior to commencing field installation and shall be included with shop drawings.
- D. Coordinate rough-in and wiring requirements for all equipment provided under other divisions of the work and requiring electrical connections with equipment supplier and installer. Make installation and connections in accordance with rough-in and wiring diagrams provided for Contractor's use. Arrange raceways, wiring, and equipment to permit ready access to switches, motors, and control components. Doors and access panels shall be kept clear.

- E. Coordinate all aspects of the electrical, telephone, and other utility services with the appropriate serving utility. No additional compensation will be allowed the Contractor for connection fees or additional work or equipment not covered in the Drawings or Specifications which are a result of policies of the serving utility.
- F. Coordinate underground work with other contractors working on the site. Particular coordination shall be performed with contractors installing storm sewer, sanitary sewer, gas, water and irrigation lines to avoid conflicts. Common trenches may be used with other trades, providing clearances required by codes and ordinances are maintained.

1.6 WARRANTY:

- A. Provide a written warranty covering the work done under this Division as required by the General Conditions. Incandescent lamps will be excluded from this warranty.
- B. Apparatus:
 - 1. Free of defects of material and workmanship and in accord with the Contract Documents.
 - 2. Built and installed to deliver its full rated capacity at the efficiency for which it was designed.
 - 3. Operate at full capacity without objectionable noise or vibration.
- C. Systems: Any system damage caused by failures of any system component shall be included.

1.7 ELECTRICAL DRAWINGS:

- A. The Drawings that accompany the Division 26, 27 and 28 Specifications are diagrammatic. They do not show all offsets, fittings, or accessories that may be required to install work in the space provided and avoid conflicts. Follow the Drawing as closely as is practical and install additional bends, offsets, fittings, and accessories where required by local conditions from measurements taken at the jobsite. The right is reserved to make minor field order changes in outlet location prior to roughing-in without additional cost to the Owner.
- B. Lower case letters adjacent to devices or luminaires indicate switching arrangement or circuit grouping. Numbers adjacent to devices indicate circuit connection.
- C. The intent of the branch circuiting and switching shown shall not be changed nor homeruns combined without the approval of the Architect. Feeder runs are not to be combined or changed.
- D. Cross or hash marks on conduit runs indicate quantity of No. 12 copper branch circuit conductors unless otherwise noted. Where such marks do not appear, provide quantity of circuit conductors to the outlets shown to perform the control or circuiting indicated. Include ground, travelers and switchlegs as required by the circuiting arrangement.

1.8 SUBMITTALS:

- A. Coordinate with the requirements of Section 01.

- B. Submit five copies of electrical shop drawings and equipment data in expandable folders equal to Smead No. 1524E within 45 days from notice to proceed. Each submitted section shall include data on all equipment requiring submittals for that section. Include in each folder a complete index for all Sections and materials requiring submittals.
- C. Include manufacturer's detailed specifications and data sheets to fully describe equipment furnished. Assure that all deviations from the Drawings and Specifications are specifically noted in the submittals. Failure to comply will automatically void any implied approval for use of the equipment on this project.
- D. Review and recommendations by the Architect or Engineer are not to be construed as change authorizations. If discrepancies between the materials or equipment submitted and the Contract Documents are discovered either prior to or after the data is processed, the Contract Documents will govern.
- E. Engineer's review is for general conformance with the design concept of the project and the information given in the construction documents. The contractor is solely responsible for, and this review does not include: confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating the work with that of other trades and performing all work in safe and satisfactory manner. Corrections or comments made on the submittal during review do not relieve the contractor from compliance with the requirements of the construction documents or with its responsibilities listed herein.
- F. The Installation Drawings called for under submittals shall show all outlets, devices, terminal cabinets, conduits, wiring, and connections required for the complete system described. Prints of these drawings shall be submitted prior to starting installation. The Contractor submitted drawings will then form the basis for installation.
- G. Record in-progress drawings shall be kept up to date as the work progresses showing all changes, deviations, addendum items, change orders, corrections, or other variations from the Contract Drawings. The marked up drawings shall be kept at the jobsite and available for the Architect's review. At the completion of the work, all deviations from the installation drawings shall be incorporated on the reproducibles to indicate "as-built" conditions. The drawings shall then be submitted to the Architect as Record Drawings for the system.

1.9 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS:

- A. Coordinate with the requirements of Section 01.
- B. Prior to the date of Substantial Completion, prepare detailed operating and maintenance manuals for equipment and systems installed. Operating and Maintenance Manuals will be used for training of and use by the Owner's personnel in the operation and maintenance of the systems.
- C. Format of the manuals shall be based on a separate manual or chapter for each class of system as follows:
 - 1. Secondary distribution system.
 - 2. Low voltage distribution system.
 - 3. Standby power system.

4. Egress lighting system.
 5. Security system.
 6. Lighting systems, including lamps.
 7. Lighting control system, interior and exterior.
 8. Wiring devices, i.e., GFI receptacles and cable reels.
- D. Content of each manual or chapter shall include but shall not be limited to the following:
1. Description of system.
 2. Operating Sequence and Procedures:
 - a. Step-by-step procedure for system start-up, including a pre-start checklist. Refer to controls and indicators by nomenclature consistent with that used on panels and in control diagrams.
 - b. Detailed instruction in proper sequence, for each mode of operation (i.e., day-night, staging of equipment).
 - c. Emergency Operation: If some functions of the equipment can be operated while other functions are disabled, give instructions for operations under those conditions. Include here only those alternate methods of operations (from normal) which the operator can follow when there is a partial failure or malfunctioning of components or other unusual condition.
 - d. Shutdown Procedure: Include instructions for stopping and securing the equipment after operation. If a particular sequence is required, give step-by-step instructions in that order.
 3. Preventive Maintenance:
 - a. Provide a schedule for preventive maintenance. State the recommended frequency of performance of each preventive maintenance task such as cleaning, inspection, and scheduled overhauls.
 - b. Cleaning: Provide instructions and schedules for all routine cleaning and inspection with recommended lubricants.
 - c. Inspection: If periodic inspection of equipment is required for operation, cleaning, or other reasons, indicate the items to be inspected and give the inspection criteria.
 - d. Provide instructions for lubrication and adjustments required for preventive maintenance routines. Identify test points and given values for each.
 4. Manufacturers' Brochures: Include manufacturers' descriptive literature covering devices and equipment used in the system, together with illustrations, exploded views, and renewal parts lists. Manufacturers' standard brochures shall be edited so that the information applying to the ACTUAL installed equipment is clearly defined.

- E. Submit two draft copies of the complete operating and maintenance manual for review to the Architect for approval.
- F. Submit three copies of the final operating and maintenance manuals bound in 3-ring binders with tabs and index at least five days prior to the inspection for Substantial Completion.

1.10 CONTRACT COST DATA:

- A. Furnish to the Architect a cost breakdown of the Electrical Work.
- B. The cost breakdown shall include separate amounts for material, labor and mark-up for each CSI specification section included. Include cost data with the shop drawings submittal.

1.11 CHANGE ORDERS:

- A. All supplemental cost proposals by the Contractor shall be accompanied with a complete itemized breakdown of labor and materials without exception. At the Architect's request, Contractor's estimating sheets for the supplemental cost proposals shall be made available to the Architect. Labor must be separated and allocated for each item of work.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Electrical products installed in this project shall be listed by a recognized testing laboratory or approved in writing by the local inspection authority as required by governing codes and ordinances.
- B. Materials shall be new, of the best quality, and American made. The materials shall be manufactured in accordance with NEMA, ANSI, U.L. or other applicable standards.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Provide a complete properly operating system for each item of equipment called for under this work. Installations shall be in accord with the equipment manufacturer's instructions, the best industry practices and the contract documents. Where a conflict in these guides appear, the Architect shall be requested to provide proper clarification before work is roughed in and the Architect's decision will be final. Work installed without such clarification shall be removed and corrected by the Contractor at no cost to the Owner.
- B. Make installation in a neat, finished, and safe manner according to the latest published NECA Standard of Installation under competent supervision.

- C. Install intumescent material around ducts, conduits, etc., to prevent spread of smoke or fire where installed in sleeves or block-outs penetrating rated fire barriers. The penetration sealing system must be capable of passing a 3-hour test per ASTM E-814 (UL 1479) and must consist of a material capable of expanding nominally eight times when exposed to temperatures of 250-350°F. An alternate method utilizing intumescent materials in caulk and/or putty form may be used.

3.2 NOISE CONTROL:

- A. Outlet boxes at opposite sides of partitions shall not be placed back to back nor straight through boxes be employed, except where specifically permitted on the Drawings by note to minimize transmission of noise between occupied spaces.
- B. Conduit shall be routed along corridors or other "noncritical" space to minimize penetrations through sound rated walls. All penetrations through sound rated partitions shall be grouted solid and airtight. Conduit and its associated attachment shall not rigidly connect (i.e., bridge) independent wall structures. Flexible connections or attachments are required.
- C. Contactors, transformers, starters, and similar noise producing devices shall not be placed on walls which are common to occupied spaces unless specifically called for on the Drawings. Where such devices must be mounted on walls common to occupied spaces, they shall be shock mounted or isolated in such a manner as to effectively prevent the transmission of their inherent noise to the occupied space.
- D. Ballasts, contactors, starters, transformers, and like equipment which are found to be noticeably noisier than other similar equipment on the project will be deemed defective and shall be replaced.

3.3 EQUIPMENT CONNECTIONS:

- A. Provide complete electrical connections for all items of equipment requiring such connections, including incidental wiring, materials, devices, and labor necessary for a finished working installation.
- B. Verify the location and method for connecting to each item of equipment prior to roughing-in. Check the voltage and phase of each item of equipment before connecting.
- C. Make motor connections for the proper direction of rotation. Minimum size flex for mechanical equipment shall be 1/2 inch except at small control devices where 3/8-inch flex may be used. Exposed motor wiring shall be jacketed metallic flex with 6 inches minimum slack loop. Pump motors shall not be test run until liquid is in the system.
- D. Control devices and wiring relating to the HVAC systems will be furnished and installed under Division 23, 24 and 35 except for provisions or items specifically noted on the electrical Drawings or specified herein.

3.4 EQUIPMENT SUPPORT:

- A. Each fastening device and support for electrical equipment, luminaires, panels, outlets, and cabinets shall be capable of supporting not less than four times the ultimate weight of the object or objects fastened to or suspended from the building structure.

- B. Properly and adequately support luminaires installed under this work from the building structure. Supports shall provide proper alignment and leveling of luminaires. Flexible connections where permitted to exposed luminaires shall be neat and straight, without excess slack, attached to the support device.
- C. Support all junction boxes, pull boxes, or other conduit terminating housings located above the suspended ceiling from the floor above, roof, or penthouse floor structure to prevent sagging or swaying.
- D. Conduits:
 - 1. Support suspended conduits 1 inch and larger from the overhead structural system with metal ring or trapeze hangers and threaded steel rod having a safety factor of 4. Conduits smaller than 1 inch, installed in ceiling cavities, may be supported on the mechanical system supports when available space and support capacity has been coordinated.
 - 2. Anchor conduit installed in poured concrete to the steel reinforcing with No. 14 black iron wire.
- E. Powder actuated or similar shot-in fastening devices will not be permitted for any electrical work except by special permission from the Architect.

3.5 ALIGNMENT:

- A. Install panels, cabinets, and equipment level and plumb, parallel with structural building lines. Switchgear panels and all electrical enclosures shall fit neatly without gaps, openings, or distortion. Properly and neatly close all unused openings with approved devices.
- B. Fit surface panels, devices, and outlets with neat, appropriate trims, plates, or covers without overhanging edges, protruding corners, or raw edges to leave a finished appearance.

3.6 CUTTING AND PATCHING:

- A. Include cutting, patching and restoration of finishes necessary for this work. Surfaces damaged by this work and spaces around conduits passing through floors and walls shall be neatly patched and finished to match the adjacent construction including painting or other finishes. Clean up and remove all dirt and debris. This work shall all be performed to the satisfaction of the Architect.
- B. Where equipment installations or connections require the installation of an access panel, arrange with General Contractor to provide a properly sized and installed access panel similar to those used for mechanical equipment access.

3.7 PROTECTION OF WORK:

- A. Protect all electrical work and equipment installed under this Division against damage by other trades, weather conditions, or any other causes. Equipment found damaged or in other than new condition will be rejected as defective.
- B. Switchgear, transformers, panels, luminaires, and all electrical equipment shall be kept covered or closed to exclude dust, dirt, and splashes of plaster, cement, or paint and shall be free of all such contamination before acceptance. Enclosures and trims shall be in new condition, free of rust,

scratches, and other finish defects. Properly refinish in a manner acceptable to the Architect, if damaged.

3.8 MAINTENANCE OF SERVICE:

- A. Electrical service shall be maintained to all functioning portions of the building throughout construction, except as noted below, during all normal working hours of the building occupants. Outages to occupied areas shall be kept to a minimum and be pre-arranged with the Architect or Owner's Representative. This Contractor will be liable for any damages resulting from unscheduled outages or for those not confined to the pre-arranged times.
- B. Signal and communication systems and equipment shall be kept in operation wherever these serve occupied or functional portions of the building. Outages of these facilities shall be treated the same as electrical power outages.
- C. Telephone services where required during the construction work will be maintained by the Owner's communications personnel. This work shall be coordinated with the Owner's Representative and Architect in such a manner that service, as required by the building occupants, can be readily installed and maintained.
- D. Include all costs for temporary facilities, overtime labor and necessary provisions to maintain electrical services in the initial bid proposal. Temporary wiring and facilities, if used, shall be removed and the site left clean before final acceptance.

3.9 DEMOLITION AND SALVAGE:

- A. Remove or relocate all electrical wiring, equipment, luminaires, etc., as may be encountered in removed or remodeled areas in the existing construction affected by this work. Disconnect electrical service to hard wired equipment scheduled for removal under other Divisions of Work. Wiring which serves usable existing outlets shall be restored and routed clear of the construction or demolition. Safely cut off and terminate all wiring to be abandoned and remove to leave site clean.
- B. Existing concealed conduits in good condition may be reused for installation of new wiring where available. Existing undamaged, properly supported surface conduits may be reused where surface conduits are called for, provided that the installation meets all workmanship requirements of the Specifications. Where new wiring is added or existing wiring disturbed in existing branch circuit raceways, all existing wires shall be replaced with new.
- C. Removed materials not scheduled for reuse shall become the property of the Contractor for removal from the site, except for those items specifically indicated on the Demolition Drawings for salvage or reuse. Neatly store salvaged items at one location at the site where directed by the Owner's Representative.
- D. Salvage properly operating circuit breakers from panels scheduled for removal and use to replace faulty or inadequate breakers in existing panels scheduled to remain.

3.10 COMPLETION AND TESTING:

- A. Upon completion, systems shall be tested to show the equipment installed operates as designed and specified, free of faults and unintentional grounds. The system tests shall be set up for as

many at one time as possible to work into construction phasing. Tests shall be done in the presence of the Architect or his representative, and shall be scheduled 48 hours in advance.

- B. A journeyman electrician with required tools shall be available to conduct all tests, with or without the equipment factory representative present.
- C. Systems shall include, but not be limited to the following systems:
 - 1. Standby power
 - 2. Fire alarm
 - 3. Security
 - 4. Lighting control systems
 - 5. Emergency egress lighting
 - 6. Megger testing
 - 7. Ground electrode test
 - 8. GFI receptacles testing
 - 9. Stand-by generator testing
- D. A written record of performance tests shall be compiled, dated, witnessed, and submitted along with operating and maintenance data to the Architect prior to final acceptance.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Conductor sizes shown on Drawings are sized for copper and shall be considered minimum for ampacities and voltage drop requirements.
- B. Conductors for special systems shall be as recommended by the equipment manufacturer except as noted.
- C. Deliver conductors to the job site in cartons, protective covers, or on reels.

1.2 SUBMITTALS:

- A. Product data.
- B. Test reports.

PART 2 - PRODUCTS

2.1 CONDUCTORS - 600V:

- A. Type:
 - 1. Copper: No. 12 AWG minimum size unless noted otherwise, No. 8 and larger, Class B concentric or compressed stranded.
- B. Insulation:
 - 1. Copper: THW, THHN, THWN unless noted or specified otherwise. XLP where required for low leakage.
- C. Thru wiring in fluorescent luminaires shall be rated for 90 degree C minimum.
- D. Manufacturers: Alcan, General, Essex, Rome, Southwire, or equal.

2.2 POWER LIMITED WIRING:

- A. Copper, stranded or solid as recommended by the system manufacturer.
- B. Insulation shall be appropriate for the system and location used.

2.3 CONNECTORS - 600V AND BELOW:

- A. Branch Circuit Conductor Splices: Live spring type, Scotchlok, Ideal Wire Nut, Buchanan B-Cap, or 3M Series 560 self-stripping type.

- B. Cable Splices: Compression tool applied sleeves, Kearney, Burndy, or equal with 600V heat shrink insulation. For cable splices in sub-terrain/underground vaults or any wet locations shall be provide with 600V 3M Series DBR-6 or approved.
- C. Terminator Lugs for Stranded Wire:
 - 1. No. 10 Wire and Smaller: Spade flared, tool applied.
 - 2. No. 8 Wire and Larger: Compression tool applied, Burndy, Anderson, or equal. Set screw type terminator lugs supplied as an integral part of switches and circuit breakers will be acceptable for terminating only copper conductors.

PART 3 - EXECUTION

3.1 CONDUCTORS:

- A. Pulling compounds may be used for pulling all but low leakage type XLP insulated conductors on isolated power systems. Clean residue from the conductors and raceway entrances after the pull is made.
- B. Pulleys or blocks shall be used for alignment of the conductors when pulling. Pulling shall be in accordance with manufacturer's specifications regarding pulling tensions, bending radii of the cable, and compounds. A dynamometer shall be utilized on all high voltage cable pulls to insure that the maximum allowed cable tension is not exceeded. The Architect and Engineer shall be notified prior to all cable pulls. Record the maximum strain of each pull.
- C. Conductors entering terminal or junction boxes mounted on hermetically sealed refrigeration compressor motors shall be copper.
- D. Make up and insulate wiring promptly after installation of conductors. Wire shall not be pulled in until all bushings are installed and raceways terminations are completed. Wire shall not be pulled into conduit embedded in concrete until after the concrete is poured and forms are stripped.
- E. Wire devices external to isolating panels with copper stranded conductors having a cross-linked polyethylene insulation or equivalent with a dielectric constant of 3.5 or less. Minimum insulation wall thickness shall be 1/32" for #10 and #12 AWG and 5/64" for #8 AWG and larger conductors. Wiring shall be color coded in accordance with NEC and appropriate NFPA Standards.
- F. Minimum insulation wall thickness shall be 1/32" for #10 and #12 AWG and 5/64" for #8 AWG and larger conductors. Wiring shall be color coded in accordance with NEC and appropriate NFPA standards.

3.2 CONNECTORS:

- A. Control and special systems wires shall be terminated with a tool applied spade flared lug when terminating at a screw connection.
- B. All screw and bolt type connectors shall be made up tight and retightened after an eight hour period.

- C. All tool applied compression connectors shall be applied per manufacturer's recommendations and physically checked for tightness.

3.3 COLOR CODING:

- A. Secondary service, feeders, and branch circuit conductors shall be color coded. Phase color code to be consistent at all feeder terminations, A-B-C left-to-right, A-B-C top-to-bottom, or A-B-C front-to-back. Color code shall be as follows:

<u>208Y/120 volt</u>	<u>Phase</u>
Black	A
Red	B
Blue	C
White	Neutral
Green	Ground*

* Grounds for isolated ground receptacles shall be green with yellow tracer.

- B. Use solid color compound or solid color coating for No. 12 and No. 10 branch circuit conductors and neutral sizes.
- C. Phase conductors No. 8 and larger color code using one of the following:
 - 1. Solid color compound or solid color coating.
 - 2. Stripes, bands, or hash marks of color specified above.
 - 3. Colored as specified using 3/4-inch wide tape. Apply tape in half overlapping turns for a minimum of three inches for terminal points and in junction boxes, pull boxes, troughs, manholes, and handholes. Apply the last two laps of tape with no tension to prevent possible unwinding. Where cable markings are covered by tape, apply tags to cable stating size and insulation type.
- D. Switchlegs, travelers, etc., to be consistent with the phases to which connected or a color distinctive from that listed.
- E. Color coding of the flexible wiring system conductors and connectors shall be the manufacturer's standard.
- F. For modifications and additions to existing wiring systems, color coding shall conform to the existing wiring system.

3.4 TESTS:

- A. Perform insulation resistance tests on all phase and neutral conductors of feeders and circuits over 100 ampacity, 480 volt and below, with a 1000 volt megger. The written test report listing the results of the test to be submitted to Architect. Equipment which may be damaged by this test shall be disconnected prior to the test.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Provide complete ground systems as specified herein and shown on the Drawings. Include conduit system, transformer housings, switchboard frame and neutral bus, motors, and miscellaneous grounds required.
- B. Continue existing system as specified herein and shown on the Drawings.

PART 2 - PRODUCTS

2.1 GROUND CONDUCTORS:

- A. Bare or green insulated copper for interior systems.
- B. Bare copper for underground or exterior systems.

2.2 CONNECTORS:

- A. Cast, set screw or bolted type.
- B. Form poured, exothermic welds.
- C. Grounding lugs where provided as standard manufacturer's items on equipment.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Grounding Conductors: Sized in accord with Article 250, Tables 250-122 and 250-66 of the National Electrical Code.
- B. Grounding Conductor Connectors: Made up tight and located for future servicing and to insure low impedance.
- C. Ground the electrical system, the cold water service, structural steel, and transformers to the building ground grid.
- D. All Plug-in Receptacles: Bonded to the boxes, raceways, and grounding conductor.
- E. Provide equipment grounding conductor in all PVC conduit runs.
- F. Provide ground bonding to above ground portion of metal gas piping per NEC 250-104(b).
- G. All separately derived systems shall be solidly grounded to the nearest water piping.

3.2 EQUIPMENT:

- A. Provide separate green insulated equipment ground conductor in all non-metallic and flexible electrical raceways. Effectively ground all luminaires, panels, controls, motors, disconnect switches, exterior lighting standards, and noncurrent carrying metallic enclosures. Use bonding jumpers, grounding bushings, lugs, buses, etc., for this purpose.
- B. Provide grounding bushings on all feeder conduit entrances to panels and equipment enclosures and bond bushings to enclosures with minimum No. 10 AWG conductor. Connect the equipment ground to the building system ground. Use the same size equipment ground conductors as phase conductors, up through No. 10 AWG.

3.3 GROUND RESISTANCE TEST:

- A. Ground electrode resistance test shall be accomplished with a ground resistance direct-reading single test meter utilizing the Fall-of-Potential method and two reference electrodes. Perform test prior to interconnection to other grounding systems. Orient the concrete-encased ground electrode to be tested and the two reference electrodes in a straight line spaced fifty (50) feet apart. Drive the two reference electrodes five (5) feet deep.
- B. Test results shall be in writing and shall show temperature, humidity and condition of the soil at the time of the tests in the case where the ground resistance exceeds 5 ohms. The Engineer will issue additional instructions.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Provide raceways and conduits of specified types for all electrical systems wiring, except where clearly shown or specified otherwise. All fittings, boxes, hangers and appurtenances shall be included.
- B. Size raceways and conduits as specified. Where no size is indicated, conduit may be the minimum code permitted size for the quantity of conductors installed, based upon NEC tables for conductors with type **THW/TW** insulation.

PART 2 - PRODUCTS

2.1 METALLIC CONDUITS:

- A. Galvanized Rigid Conduit (GRC): Smooth surfaced heavy wall mild steel tube of uniform thickness and temper, reamed and threaded at each end and protected inside and out with galvanizing, sherardizing, or equivalent process. GRC shall comply with NEC Article 346.
- B. Intermediate Metallic Conduit (IMC): Smooth surface, intermediate wall mild steel tube of uniform thickness and temper, reamed and threaded at each end, and protected inside and out with galvanizing, sherardizing, or equivalent process. IMC shall comply with NEC Article 345.
- C. Electrical Metallic Tubing (EMT): Smooth surface, thin wall mild steel tube of uniform thickness and temper, galvanized or sherardized on the outside, and enameled on the interior. EMT shall comply with NEC Article 348.
- D. Flexible Conduits (Flex):
 - 1. Flexible Metallic Conduit: Interlocking single strip steel construction, galvanized inside and out after fabrication. Flex shall comply with NEC Article 350.
 - 2. Liquid Tight: Similar to flexible metallic conduit, except encased in a liquid tight polyvinylchloride or equivalent outer jacket over the flexible steel core, and shall comply with NEC Article 351.

2.2 NON-METALLIC CONDUITS:

- A. Underground Ducts:
 - 1. PVC, Encased Burial: Type EB for concrete encasement, shall meet or exceed the current requirements of EB-20/ASTM F512, NEMA TC-6 and U.L. 651. Rate for use with 90°C wire.
 - 2. PVC, Direct Burial: Type DB suitable for direct burial, shall meet or exceed the current requirements of DB-20/ASTM F512 and NEMA TC-6. Rate for use with 90°C wire.
- B. Rigid Non-Metallic Conduit: Type II PVC Schedule 40, suitable for use with 90°C rated wire. Conduit shall conform to UL Standard 651 and carry appropriate UL listing for above and below ground use.

2.3 WIREWAYS:

- A. Troughs: Steel, painted, square in cross section, preformed knock-outs on standard spacing, screw cover.
- B. Fittings: Tees, elbows, couplings as required for configuration shown on the Drawings.

2.4 FITTINGS:

A. GRC and IMC:

- 1. Threaded Locknuts: Sealing type where used with NEMA 2, 3, 3R, 4 and 12 enclosures.
- 2. Threaded Bushings: 1 1/4 inch and larger, insulated, grounding type as required under Section 16450.
- 3. Threaded Couplings: Standard threaded of the same material and as furnished with conduit supplied. Erickson type couplings may be used where required to complete conduit runs larger than 1 inch.

B. EMT:

- 1. Connectors: Steel compression ring or steel set screw type for conduit termination, with insulated throat, suitable for conditions used. Use lay-in grounding type bushings where terminating grounding conductors.
- 2. Couplings: Steel compression ring or steel set screw type, concrete tight.

C. Threadless: GRC and IMC couplings and box connectors may be steel threadless, compression ring or set screw type for use with conduits 1 inch and smaller where installed in poured concrete locations or where limited working space makes threaded fittings impractical.

D. Weatherproof Connectors: Threaded.

E. Expansion Couplings: Equal to O.Z. type EX with jumper.

F. Seal-Offs: With filler fiber, compound, removable cover.

2.5 METALLIC BOXES:

A. Flush and Concealed Outlet Boxes: Galvanized stamped steel with screw ears for device ring mounting, knock-out plugs, mounting holes, fixture studs if required, RACO or equal.

B. Surface Outlet Boxes: Galvanized stamped steel same as above for use on ceilings; cast steel or aluminum with threaded hubs or bosses for use on walls.

C. Large Boxes: Boxes exceeding 4-11/16 inches square when required shall be welded steel construction with screw cover and painted, steel gauge as required by physical size, Hoffman, Circle AW or equal.

D. Systems: Boxes for systems devices shall be as recommended by the systems manufacturer, suitable for the equipment installed. Equip with grounding lugs, brackets, device rings, etc., as required.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Conceal all conduits in finished spaces. Concealed conduits shall run in a direct line with long sweep bends and offsets. GRC and IMC embedded in concrete below grade or in damp locations shall be made watertight by painting the entire male thread with Rustoleum metal primer or equal before assembly.
- B. Route exposed conduit parallel or at right angles to structural building lines and neatly offset into boxes. Conduits attached directly to building surfaces shall closely follow the surfaces. Conduit fittings shall be used to "saddle" under beams. Drilling or notching of existing beams, trusses on structural members shall be coordinated with Architect prior to commencing.
- C. GRC and IMC terminations at boxes, cabinets, and general wiring enclosures shall be rigidly secured with double locknuts and bushings or approved fittings. Conduit shall be screwed in and shall engage at least five threads in hub where conduit boxes with threaded hubs or bosses are used. Insulating bushings shall be used for conduits 1-1/4 inches or larger.
- D. Keep conduit and raceways closed with suitable plugs or caps during construction to prevent entrance of dirt, moisture, concrete, or foreign objects. Raceways shall be clean and dry before installation of wire and at the time of acceptance.
- E. Pack spaces around conduits with polyethylene backing rods and seal with polyurethane caulking to prevent entrance of moisture where conduits are installed in sleeves or block-outs penetrating moisture barriers.

3.2 CONDUIT:

- A. GRC may be used in all areas for wiring systems. GRC shall be installed for wiring underground in cast concrete construction, in damp locations, and in hazardous areas for serving fire pump controllers and where subject to mechanical injury with threaded fittings made up tight. IMC may be used in locations not in contact with earth or fill.
- B. EMT may be used in all other dry protected locations. Provide green equipment bonding conductor where used for power circuit feeders 2-inch and larger. EMT, whether exposed or concealed, shall be securely supported and fastened at intervals of nominally every 8 feet and within 24 inches of each outlet, ell, fitting, panel, etc.
- C. Flex shall be used for connections to vibration producing equipment and where installation flexibility is required with a minimum 12 inches slack connection. Limit flex length to 36 inches for exposed equipment connections and 72 inches in concealed ceiling and wall cavities. PVC jacketed flex shall be used in wet locations, areas subject to washdown, and exterior locations.
- D. PVC Type II Schedule 40 may be used underground and in and under interior slabs, poured concrete walls, and where scheduled or noted on the Drawings. Make connections with waterproof solvent cement. Provide GRC at 60 degree and larger bends and where penetrating slabs.

3.3 RACEWAYS:

- A. Surface metal wireways may be installed at locations to serve motor starters or other control devices where required by a multitude of wiring interconnections or physical layout.

3.4 FITTINGS:

- A. Metallic raceways and conduits shall be assembled continuous and secured to boxes, panels, etc., with appropriate fittings to maintain electrical continuity. All conduit joints shall be cut square and reamed smooth with all fittings drawn up tight.
- B. Crimp-on, tap-on, indenter type, malleable iron or cast set screw fittings shall not be used.

3.5 BOXES:

- A. Boxes and outlets shall be mounted at nominal center line heights shown on the drawings. Adjust heights in concrete masonry unit (CMU) walls to prevent devices or finish plates from spanning masonry joints.
- B. Outlet boxes shall be of code required size to accommodate all wires, fittings, and devices. Provide multi-gang boxes as required to accept devices installed with no more than one device per gang. Equip all metallic boxes with grounding provisions.
- C. Flush wall switch and receptacle outlets used with conduit systems shall be 4 inches square, 1-1/2 inches or more deep, with one or two-gang plaster ring mounted vertically. Where three or more devices are at one location, use one piece multiple gang tile box or gang box with suitable device ring.
- D. Wall bracket and ceiling surface mounted luminaire outlets shall be 4-inch octagon 1-1/2 inches deep with 3/8-inch fixture stud where required. Wall bracket outlets to have single gang opening where required to accommodate fixture canopy. Provide larger boxes or extension rings where quantity of wires installed requires more cubic capacity.
- E. Junction boxes installed in accessible ceiling or wall cavities or exposed in utility areas shall be a minimum of 4 inches square, 1-1/2 inches deep with appropriately marked blank cover.
- F. Boxes for the special systems shall be suitable for the equipment installed. Coordinate size and type with the system supplier.
- G. Provide pull boxes where shown for installation of cable supports or where required to limit the number of bends in any conduit to not more than three 90 degree bends. Use galvanized boxes of code required size with removable covers installed so that covers will be accessible after work is completed.
- H. Recessed boxes shall be flush with finished surfaces or not more than 1/8-inch back and be level and plumb. Long screws with spacers or shims for mounting devices will not be acceptable. No combustible material shall be exposed to wiring at outlets.
- I. Covers for flush mounted boxes in finished spaces shall extend a minimum of 1/4-inch beyond the box edge to provide a finished appearance. Finish edge of cover to match cover face.
- J. Boxes installed attached to a stud in sheet rock walls shall be equipped with opposite side box supports equal to Caddy #760. Install drywall screw prior to finish taping. Methods used to attach boxes to studs shall not cause projections on the face of the stud to prevent full length contact of sheet rock to the stud face.

3.6 PULL WIRES:

- A. Install nylon pull lines in all empty conduits larger than 1 inch where routing includes 25 feet or more in length or includes 180 degrees or more in bends.
- B. Where conduits requiring pull lines are stubbed out and capped, coil a minimum of 36 inches of pull line and tape at termination of conduit for easy future access. Label pull lines as to conduit starting or terminations point and intended future use.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Clearly and properly identify the complete electrical system to indicate the loads served or the function of each item of equipment connected under this work.

PART 2 - PRODUCTS

2.1 LABELS:

- A. Pre-printed: Permanent material pre-printed with black on white, with adhesive backing, Brady, 3M or equal.
- B. Laminated Plastic: 3-ply laminated plastic, black with white letters, for 208/120V equipment and red with white letters for 480/277V equipment. Lamicoid or equal.
- C. Clear Plastic Tape: Black 12 point Helvetica medium characters machine imprinted on clear tape, Merlin, Kroy or equal.
- D. Plastic Tape: Black or red with white letters, adhesive backing, field printed with proper tool, Dymo-tape or equal.
- E. Wire Markers: White with black numbers, adhesive backed tape on dispenser roll, Brady, 3M or equal.

PART 3 - EXECUTION

3.1 BRANCH CIRCUIT PANELBOARDS:

- A. Indicate panel number with laminated plastic labels. Indicate voltage phase and feeder source, feeder wire size, and feeder breaker or fuse size with plastic tape labels on the inside of the panel door.
- B. Provide typewritten panel directories, with protective, clear transparent covers, accurately accounting for every breaker installed including spares. Schedules shall use the actual room designations assigned by name or number near completion of the work and not the space designation on the Construction Drawings.

3.2 EQUIPMENT:

- A. Label all disconnect switches, motor starters, relays, contactors, and time switches indicating equipment served with plastic tape labels.
- B. Where the controlling device is remote mounted from the serving panel, include the serving panel designation and circuit number with additional plastic tape labels.

3.3 DEVICES:

- A. Label each receptacle plate with preprinted clear plastic press on labels with 3/16" minimum black letters indicating serving panel and circuit number. Clean all oils, dirt and any foreign materials from plate prior to label application.
- B. Receptacles connected to a GFCI protected circuit downstream from the protecting device shall be so labeled.

3.4 RACEWAYS AND BOXES:

- A. Label all pull boxes and junction boxes for systems with paint or marker pen on box cover identifying system. Where box covers are exposed in finished areas, label inside of cover. Covers shall be color labeled as follows: 208Y/120V wiring - black; fire alarm - red; communications - green; security - blue.
- B. Label each end of pull wires left in empty conduits with tags or tape indicating location of other end of wire.

3.5 SYSTEMS:

- A. Complex control circuits may utilize any combination of colors with each conductor identified throughout, using wraparound numbers or letters. Use the number or letters shown where the Drawings or operation and maintenance data indicate wiring identification.
- B. Label the fire alarm and communication equipment zones, controls, indicators, etc., with machine printed labels or indicators appropriate for the equipment installed as supplied or recommended by the equipment manufacturer.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Tie new panelboards into existing secondary power distribution system as specified herein and shown on drawings. Secondary distribution system shall be fully rated. Series rating shall not be acceptable.

1.2 SUBMITTALS:

- A. Shop drawings.
- B. Product data.
- C. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. Match existing manufacturer: Eaton Corporation (Westinghouse).

2.2 BRANCH PANELBOARDS:

- A. Branch Circuit Panels: Bolt-in circuit breaker type with aluminum or copper bussing. Panels shall be fitted with flush lift latches and locks keyed alike, same as existing. Deliver all panel keys to the Owner at completion of the project.
- B. Main Circuit Breakers: Equip panels indicated with main circuit breakers sized as scheduled and mounted behind door at top of panel. Back feeding of branch circuit breakers is not acceptable.
- C. Branch Circuit Breakers: Molded case, thermal magnetic type. Breakers shall have short circuit capacity rating to withstand the maximum short circuit duty which can be expected at the breaker location in the electrical system. Breakers mounted in branch panelboards shall be of the bolt-in type. Circuit breakers used for switching duty shall be UL listed for that purpose and marked "SWD". Minimum short circuit rating for any circuit breaker: 10,000 A.I.C. for 120V and 208V breakers.
- D. Wiring Gutters: A minimum of 4 inches wide except where feeder conductors enter where a minimum of 6 inches clear shall be provided. Feeder conductors to enter directly in line with lug terminals wherever practicable. Provide separate feeder studs for each feeder conductor compression lug.
- E. Cabinets: Flush doors with concealed hinges and mounting clamps equal to Square D Mono Flat, or ITE Decor trim. Surface panels shall have metal face trims with no sharp edges or corners. Finish surface panel tubs to match face trim.

- F. Ground Bus: Provide a grounding bus with termination capacity for the grounding conductor sized for the branch circuit equipment grounding conductors in isolated ground 208Y/120V panels identified by suffix IG. Grounding bus shall be bonded to the panel cabinet.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install the secondary distribution system assemblies and equipment as specified, parallel and square with the building lines.
- B. Neatly lace and secure the conductors of the feeder circuits individually at maximum 2 foot intervals. The cable lugs shall not support the weight of the cables.

3.2 BRANCH PANELBOARDS:

- A. Install panelboards plumb and level, 6'-0" to top unless noted otherwise.
- B. Equip selected breakers with mechanical locking devices such that they may be locked in the "on" position. Selected breakers shall include those serving alarm systems, fire suppression systems, communications systems and other critical loads directed.
- C. Install a spare 3/4-inch conduit from flush panels for each three single pole breakers or spaces provided. Terminate conduits above accessible ceiling or as directed.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Provide wiring devices and plates or blank plates only for all outlet boxes.

1.2 SUBMITTALS:

- A. Product data.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. Wiring Devices and Plates: Hubbell, Leviton, Pass & Seymour.

2.2 MATERIALS:

- A. Wiring devices shall be specification grade, with special devices as specified and required. Furnish a matching cap for all special purpose devices that do not have the common 120 volt NEMA 5-20R configuration.
- B. All lighting switches and duplex receptacles installed shall have similar appearance characteristics unless noted otherwise.

2.3 WALL SWITCHES:

- A. Line Voltage Switches: 20 ampere, 277 volt, quiet type, back and side wired. Verify finish color with architect. Hubbell CS-1221 series.
- B. Switch with pilot, lighted clear toggle, Hubbell HBL-1221-PL.
- C. Momentary Contact Switches: 15A, SPDT, center off. Verify finish color with architect. Hubbell HBL-1556.

2.4 RECEPTACLES:

- A. Normal Power Duplex: 3-wire, 2-pole grounding, steel backstrap, NEMA 5-20R, back and side wired. Verify finish color with architect.
 - 1. General Application: Hubbell CR-5362 series.
- B. Ground Fault Interrupting Duplex: NEMA 5-20R. Verify finish color with architect. UL 943, Class A. Hubbell GFR-5352A series.
- C. Special Purpose Receptacles: As noted on Drawings with NEMA configurations.

2.5 PLATES:

- A. Flush Finish Plates: .040" thick, type 302 stainless steel, brush finish.
- B. Surface Covers: Galvanized or cadmium plated steel, 1/2" raised industrial type with openings appropriate for device installed.
- C. Weatherproof: Standard duplex GFI receptacle. Hubbell WP26MH cover mounted horizontally with hinges up. Special purpose receptacles. Hubbell WP723D.
- D. Identification: Identify receptacle plates with press on labels indicating serving panel and branch circuit number.

2.6 CABLE REELS WITH PORTABLE OUTLET BOX:

- A. Manufacturer: Hubbell HBL45123R, Aero-Motive or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Devices and finish plates to be installed plumb with building lines. Wall mounted receptacles shall be installed vertically at centerline height shown on the Drawings. Unless otherwise noted on the drawings or shown/specified in the architectural drawings, details, and elevations the centerline of all receptacles shall be 18 inches above finished floor and the centerline of all light switches shall be 48 inches above finished floor per ADA. For all above counter devices, verify exact mounting heights with architectural drawings, details, and elevations.
- B. Finish plates and devices are not to be installed until final painting is complete. Scratched or splattered finish plates and devices will not be accepted.
- C. Provide weatherproof device covers on devices at all exterior locations and damp or wet label areas.

3.2 CORD CAPS:

- A. All special plugs provided with the receptacles shall be given to the Owner in their cartons with a letter stating the date and the Owner's representative that received the materials.

3.3 COORDINATION:

- A. Refer to Architectural elevations, sections and details for exact locations.
- B. Coordinate with equipment installer the locations and methods of connection to devices mounted in cabinets, counters, work benches, service pedestals and similar equipment.

3.4 TESTING:

- A. Receptacles shall be tested for line to neutral, line to ground and neutral to ground faults. Correct any defective wiring.
- B. Test all GFI receptacles and replace defective units.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Provide switches of proper characteristics as disconnecting means.

1.2 SUBMITTALS:

- A. Shop Drawings: Indicate field dimensions, description of materials and finishes, component connections, anchorage methods, hardware, and installation procedures.
- B. Product Data.
- C. Operating and Maintenance Data.

1.3 WORK IN RELATED SECTIONS

- A. 26 05 53 Identification

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. General Electric, Siemens, Square D, Cutler Hammer or Approved.

2.2 DISCONNECTS:

- A. Safety and disconnect switches shall be NEMA type HD (heavy duty), quick-make, quick-break, dual rated with electrical characteristics as required by the system voltage and the load served. Switches shall be equipped with a defeatable cover interlock and indicating handle that will accept a minimum of three padlocks.
- B. Enclosures shall be NEMA I for indoor use, unless specifically noted otherwise and NEMA 3R where installed exposed to the weather or designated by the subscript "WP".
- C. Disconnects shall be fusible or non-fusible as designated on Drawings.
- D. Rejection Fuse Clips: Provide for fusible switches (30 to 600A) to prevent the installation of Class H and Class K non-current-limiting fuses.

PART 3 - EXECUTION

3.1 DISCONNECT SWITCHES:

- A. Provide all code required disconnect switches under this work, whether specifically shown or not.

- B. Provide one manufacturer for all disconnect switches on the project.
- C. Disconnect switches shall be installed as recommended by the manufacturer and shall be square with the building structural lines.
- D. Install fuses in all fused switches.
- E. Provide identification as specified in Section 26 05 53.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Provide all lighting outlets as specified with a luminaire of the type designated and appropriate for the location. Outlet symbols on the Drawings without a type designation shall have a luminaire the same as those used in similar or like locations.
- B. Where a luminaire type designation has been omitted and cannot be determined by the Contractor, request a clarification from the Engineer and provide a suitable luminaire type as directed.
- C. Coordinate installation of luminaires with the ceiling installation and all other trades to provide a total system that is neat and orderly in appearance.
- D. Install all remote ballasts in enclosures as required by luminaire specified. Remote mounted ballasts shall be located within the distance limitations specified by the ballast manufacturer.

1.2 RELATED WORK IN OTHER SECTIONS:

- A. The provisions of Section 26 00 01 - Basic Electrical Materials and Methods, apply to work specified in this section.
- B. Section 26 27 26, Wiring Devices and Plates

1.3 QUALITY ASSURANCE:

- A. The lighting design for this project was based on luminaire types and manufacturers as specified.
- B. Other "Or Equal" Manufacturers and Products: Submit Substitution Request, complying with requirements of Section 01 Product Options and Substitutions.
- C. Equality shall be determined by the following luminaire characteristics.
Lack of data on any characteristic shall constitute justification for rejection of the submittal.
 - 1. Performance
 - a. Distribution.
 - b. Utilization.
 - c. Average brightness/maximum brightness.
 - d. Spacing to mounting height ratio.
 - e. Visual comfort probability.
 - 2. Construction
 - a. Engineering.
 - b. Workmanship.
 - c. Rigidity

d. Permanence of materials and finishes.

3. Installation Ease

- a. Captive parts and captive hardware.
- b. Provision for leveling.
- c. Through-wiring ease.

4. Maintenance

- a. Relamping ease.
- b. Replacement of ballast and lamp sockets.

5. Appearance

- a. Light tightness.
- b. Neat, trim styling.
- c. Conformance with design intent

1.4 SUBMITTALS:

A. Submit the following in accordance with Section 26050:

- 1. Shop Drawings.
- 2. Product Data.
- 3. Photometric Reports consist of a minimum of:
 - a. Candlepower Distribution Curves.
 - b. Coefficient of Utilization Table.
 - c. Zonal Lumen Summary.
- 4. Certification of lamp ballast compatibility.
- 5. Operation and Maintenance Data.
- 6. Operational Sample upon request.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Recessed luminaires shall have trims which fit neatly and tightly to the surfaces in which they are installed without leaks or gaps. Where necessary, install heat resistant non-rubber gaskets to prevent light leaks or moisture from entering between luminaires trim and the surface to which they are mounted.
- B. Recessed luminaires installed in fire rated ceilings and using a fire rated protective cover shall be thermally protected for this application and shall carry a fire rated listing.
- C. Luminaires installed under canopies, roofs or open areas and similar damp or wet locations shall be UL listed and labeled as suitable for damp or wet locations.

- D. Aligners: Ball type with nominally 45 degree movement either side of center. Provide white stem aligner canopies where installed in finished areas.

2.2 FLUORESCENT LUMINAIRES:

- A. Doors 12" X 48" and larger: Flat metal equipped with mitered corners, rotary cam or spring assisted latches to hinge from either side.
- B. Diffusers 12" X 48" and larger: Extruded of clear acrylic plastic, 0.125" minimum overall thickness, 0.045 minimum unpenetrated thickness, pattern 12 with flat sided prisms unless otherwise specified in the luminaire schedule by catalog number or remarks. Concave prisms will not be acceptable.
- C. Finish: Baked white dry polyester powder, unless otherwise specified with a minimum average reflectance of 85% on all exposed and light reflecting surfaces. Steel components shall be prepared for finishing with a 5-step zinc phosphating process.
- D. Ship all parabolic luminaires with a protective plastic wrap around parabolic louver to prevent dust buildup during construction.
- E. Ballasts shall operate a maximum of two lamps in each luminaire. Three and four lamp ballasts shall not be provided.

2.3 COMPACT FLUORESCENT LUMINAIRES:

- A. Ballasts: High power factor, suitable for lamp type(s) specified and switching controls indicated on drawings.
- B. Dimensions: Proper for the various wattage noted on the plans and as recommended by the luminaire manufacturer or as specified.
- C. Recessed: Equip with through wire junction box. Box, ballast and replaceable components shall be accessible from the ceiling opening.
- D. Reflector Cones: Of uniform gauge aluminum, free of spinning marks or other defects and have an integral trim flange. Color as specified in Luminaire Schedule and of the Alzak® process. All luminaires using Alzak® reflector cones to be supplied by the same manufacturer unless directed otherwise in Luminaire Schedule. Reflector cones shall be the low iridescent type.
- E. Finish: All visible surfaces to be of color and texture as directed in Luminaire Schedule. All concealed interior and exterior luminaire surfaces to be matte black.

2.4 HIGH INTENSITY DISCHARGE LUMINAIRES:

- A. Ballasts: Pulse start, high power factor, constant wattage auto-transformer type, suitable for lamp type specified.

- B. Luminaire dimensions: Proper for the various wattage noted on the plans and as recommended by the luminaire manufacturer or as specified.
- C. Reflector Cones: Of uniform gauge aluminum, free of spinning marks or other defects and have an integral trim flange. Color as specified in Luminaire Schedule and of the Alzak® process. All luminaires using Alzak® reflector cones to be supplied by the same manufacturer unless directed otherwise in Luminaire Schedule.

2.5 FLUORESCENT BALLASTS:

- A. Electronic: Electronic program start ballasts shall meet the requirements of UL 935 and shall bear the appropriate UL label and have the same physical dimensions and mounting arrangement as those of their core and coil counterparts. Tandem wiring between luminaires may be used to minimize the number of ballasts while accomplishing the switching requirements shown on the drawings. Advance Mark V and Mark VII, or equal. Ballasts shall have the following electrical characteristics.
 - 1. Withstand input power line transients as defined in ANSI C62.41. The ballasts shall tolerate a line voltage variation of $\pm 10\%$. The power factor shall be 90% or higher. The lamp crest factor shall measure 1.7 or less. The average Ballast Factor (BF) shall be a minimum of 92.5% under ANSI C82.2 conditions unless otherwise noted on drawings.
 - 2. Total harmonic distortion of the input current to the electronic ballast shall not exceed 10% of the input current and comply with FCC rules and regulations Part 18 concerning the generation of both EMF (electromagnetic interference) and RFI (radio frequency interference).
 - 3. The electronic ballasts shall be Class "A" sound rated and UL Class "P" thermally protected. The ballast shall be provided with an internal fuse to protect the electrical power supply from internal component failure. The ballast shall also be short-circuit protected in the event of miswiring.
 - 4. Ballasts shall be warranted against defects in materials and workmanship for five years. The warranty shall include either a \$10 replacement labor allowance or complete replacement including labor by an agent of the manufacturer.
- B. Ballasts used in enclosed and gasketed luminaires listed for use in wet locations shall be of Type I construction.
- C. Ballasts shall be rated for the expected ambient temperature in which they are installed. All exterior installed ballasts shall be rated to start the lamps at 00 F.
- D. Systems using tandem wired luminaires shall be labeled accordingly. Label shall be in the lamp compartment of each luminaire and identify the function of that luminaire.

2.6 LAMPS:

- A. Lamp each luminaire with the suitable lamp cataloged for the specific luminaire type and as indicated as manufactured by General Electric, Phillips, Osram/Sylvania, Venture or approved equal. All fluorescent lamps shall be of the same manufacturer.

- B. Fluorescent lamps: T-5 and T-8 lamps shall be 48" 32 watt, inside tri-phosphor coated, 3500 Degree Kelvin color temperature or as required by luminaire specified in the luminaire schedule. Provide low mercury content and extra life lamps, 30,000 average hours. General Electric or equal.
- C. Compact Fluorescent Lamps: Of wattage and configuration indicated in Luminaire Schedule, Tri-Phosphor, 3500°K color temperature. Lamps shall be single ended dual pin plug-in base, except those used with dimming ballasts, which shall utilize the 4-pin configuration.
- D. Metal halide lamps: Of wattage, base style, color and type indicated in Luminaire Schedule. Provide pulse start lamps.

2.7 EMERGENCY FLUORESCENT LAMP POWER SUPPLY:

- A. Manufacturers: Bodine, Iota, Lithonia
- B. Description: Self-contained battery-operated power supply for operating one T8 or compact fluorescent lamp for a minimum output of 90 minutes. Full lumen output.
- C. Provide access hatches, for emergency battery backup ballasts, adjacent to recessed 6-inch or less diameter downlights installed in inaccessible ceilings. Full lumen output.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Determine ceiling types in each area and provide suitable accessories and mounting frames where required for recessed luminaires. Luminaire catalog numbers do not necessarily denote specific mounting accessories for type of ceiling in which a luminaire may be installed.
- B. The Architectural Reflected Ceiling Plans shall take preference as to the exact placement of the luminaires in the ceiling.
- C. Leave luminaires clean at the time of acceptance of the work with every lamp in operation. If luminaires are deemed dirty by the Architect at completion of the work, the Contractor shall clean them at no additional cost.
- D. Level luminaires, align in straight lines, and locate as shown on the architectural elevations and reflected ceiling plan. The final decision as to adequacy of support and alignment, will be given by the Architect. The fixtures shall be supported by separate means from the building structure and not from the ceiling system, ductwork, piping or other systems.
- E. Aim luminaires to provide the lighting pattern for which the luminaire is designed and as directed by Engineer.
- F. Manufacturer's labels or monograms shall not be visible after luminaire is installed, but must be included for future reference.

3.2 WIRING:

- A. Recessed luminaires served from a junction box above the ceiling may be connected with 3/8" flex, 2 No. 18. Provide 3 No. 18 wires where dual circuiting is called for. Provide ground continuity.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Furnish and install complete raceway system and backboards for telephone/data equipment and devices as noted on the Drawings.
- B. Coordinate incoming service with telephone utility and comply with all telephone utility requirements.
- C. Comply with TIA/EIA Standards 569 and 607, latest edition.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Wall Outlet Boxes: 4-inch square, 2 5/8-inch deep, minimum, with single-gang mud ring unless otherwise noted on the Drawings.
- B. Conduits: 1-inch minimum size with larger sizes indicated on the Drawings. Provide PVC Schedule 40 with steel sweep ells for direct-buried conduit runs.
- C. Backboards: 3/4-inch 8-foot high, fire rated fir plywood, width as shown on the Drawing.
- D. Grounding busbar: 2-inch by 10-inch by 1/4-inch solid copper. Wall mount with insulated standoffs per TIA/EIA-607.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Conduit bends shall be large radius field bends or factory ells. Cast type fittings or sharp bends shall not be installed unless specifically approved by the systems installer. No section of conduit shall be longer than 100 feet or contain more than 180 degrees of bend between pull points or pull boxes.
- B. Where conduits are shown stubbed into a terminal area, stub 6 inches above floor or 12 inches down from ceiling at the appropriate terminal board location, terminating in insulating bushings.
- C. Provide a pull wire in all conduits longer than 15 feet or with more than 90 degrees of bend.
- D. Protect all existing telephone/data equipment and devices that will remain in service during construction from mechanical injury and dust entry.
- E. Paint front and ends of all terminal boards with two coats of enamel to match interior color specified by the Architect.
- F. Coordinate with system supplier for phasing and work scheduling.
- G. The inside radius of a bend in conduit shall be at least 6 times the internal diameter. When the conduit size is greater than 2 inches, the inside radius shall be at least 10 times the internal

diameter of the conduit. For fiber optic cable, the inside radius of a bend shall always be at least 10 times the internal diameter of the conduit.

- H. Provide all low voltage conduit stub-outs with insulated bushings.
- I. Unless otherwise noted on the drawings, provide #6CU ground minimum per telephone utility requirements.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Protecting existing trees, shrubs, plants, and grass to remain.
 - 2. Removing existing trees, shrubs, plants, and grass.
 - 3. Clearing and grubbing.
 - 4. Stripping and stockpiling topsoil.
 - 5. Removing above- and below-grade site improvements.
 - 6. Temporary erosion and sedimentation control measures.
- B. Related Sections include the following:
 - 1. Division 31 Section "Earth Moving" for soil materials, excavating, backfilling, and site grading.

1.3 DEFINITIONS

- A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.
- B. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

1.4 MATERIAL OWNERSHIP

- A. Except for stripped topsoil or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.5 SUBMITTALS

- A. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.

- B. Record drawings identifying and accurately locating capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 QUALITY ASSURANCE

- A. Preinstallation Conference: Conduct conference at Project Site.

1.7 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- B. Improvements on Adjoining Property: Authority for performing site clearing indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.
 - 1. Do not proceed with work on adjoining property until directed by Architect.
- C. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- D. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- E. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly flag trees and vegetation to remain or to be relocated.
- C. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.
- D. The boundaries of the clearing limits shown on this plan shall be clearly flagged in the field prior to construction. During the construction period, no disturbance beyond the flagged clearing

area shall be permitted. The flagging shall be maintained by the contractor for the duration of the construction.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to the City of Tigard and Erosion Control Plans.
- B. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - 1. Erosion Control Inspection: Contractor will inspect all erosion and sediment control facilities, document all inspections in a log and maintain an active Erosion and Sediment Control Plan in accordance with the NPDES General Permit and Governing Agency. The erosion and sediment control facilities will be inspected daily when runoff is occurring. If sediment or turbidity is detected in amounts greater than what is allowed by Governing Agency, Contractor will submit an Action Plan to the Governing Agency within ten days as required.
 - 2. The ESC facilities shall be inspected daily by the contractor and maintained as necessary to ensure their continued functioning.
 - 3. At no time shall more than one foot of sediment be allowed to accumulate within a trapped catch basin. All catch basins and conveyance systems shall be cleaned prior to paving. The cleaning operation shall not flush sediment laden water into the downstream system.
 - 4. Stabilized construction entrances shall be constructed at the beginning of construction and maintained for the duration of the project. Additional measures may be required to ensure that all paved areas adjacent to the project are kept clean for the duration of the project.
 - 5. Sediment fences, straw waddles, triangular silt dikes, and straw bale barriers shall be removed when they have served their useful purpose and when approved by the engineer, but not before the upslope area has been permanently stabilized.
 - 6. Construction and maintenance of graveled construction entrance, temporary sediment fences, and all erosion control work shall follow the guidelines established by the local municipalities.
 - 7. All materials shall be in good physical condition to provide proper sediment retention.
 - 8. Sediment fences and barriers shall be inspected by the contractor immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs shall be made immediately.
- C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE PROTECTION

- A. Erect and maintain temporary fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.
 - 1. Do not store construction materials, debris, or excavated material within fenced area.
 - 2. Do not permit vehicles, equipment, or foot traffic within fenced area.
 - 3. Maintain fenced area free of weeds and trash.
- B. Do not excavate within tree protection zones, unless otherwise indicated.

- C. Where excavation for new construction is required within tree protection zones, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
 - 1. Cover exposed roots with burlap and water regularly.
 - 2. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
 - 3. Coat cut faces of roots more than 1-1/2 inches in diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
 - 4. Backfill with soil as soon as possible.

- D. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Architect.
 - 1. Employ an arborist, licensed in jurisdiction where Project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.
 - 2. Replace trees that cannot be repaired and restored to full-growth status, as determined by Architect.

3.4 CLEARING AND GRUBBING

- A. Remove obstructions, trees, stumps, roots, buried logs, shrubs, grass, and other vegetation to permit installation of new construction.
 - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 - 2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
 - 3. Grind stumps and remove roots, obstructions, and debris extending to a depth of 18 inches below exposed subgrade.
 - 4. Use only hand methods for grubbing within tree protection zone.
 - 5. Chip removed tree branches and dispose of off-site.

- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.5 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.

- B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
 - 1. Remove subsoil and nonsoil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.

- C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Limit height of topsoil stockpiles to 72 inches.

2. Do not stockpile topsoil within tree protection zones.
3. Dispose of excess topsoil as specified for waste material disposal.
4. Stockpile surplus topsoil to allow for respreading deeper topsoil.

3.6 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.
 2. Paint cut ends of steel reinforcement in concrete to remain to prevent corrosion.

3.7 DISPOSAL

- A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
 1. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Preparing subgrades for walks and pavements.
 - 2. Subbase course for concrete walks.
 - 3. Subbase and base course for asphalt paving.
- B. Related Sections include the following:
 - 1. Division 31 Section "Site Clearing" for temporary erosion and sedimentation control measures, site stripping, grubbing, stripping topsoil, and removal of above- and below-grade improvements and utilities.

1.3 UNIT PRICES

- A. Unit prices for earthwork are included in Division 01 Section "Unit Prices."
- B. Quantity allowances for earthwork are included in Division 01 Section "Allowances."
- C. Rock Measurement: Volume of rock actually removed, measured in original position, but not to exceed the following. Unit prices for rock excavation include replacement with approved materials.
 - 1. 6 inches outside of minimum required dimensions of concrete cast against grade.
 - 2. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
 - 3. 4 inches beneath bottom of concrete slabs-on-grade.
 - 4. 6 inches beneath pipe in trenches.

1.4 DEFINITIONS

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
 - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Course placed between the subbase course and hot-mix asphalt paving.
- C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.

- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 - 1. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- G. Fill: Soil materials used to raise existing grades.
- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- I. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- J. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.5 SUBMITTALS

- A. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
 - 1. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.
- B. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

1.6 QUALITY ASSURANCE

- A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.
- B. Preexcavation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.7 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated.
1. Notify Architect not less than two days in advance of proposed utility interruptions.
 2. Do not proceed with utility interruptions without Architect's written permission.
 3. Contact utility-locator service for area where Project is located before excavating.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Classification: All material shall be defined as "Unclassified Excavation", or "Borrow Excavation".
- C. Unclassified Excavation: Unclassified excavation shall consist of the excavation and disposal of all material, regardless of its nature, required to complete the project not otherwise classified and included in the bid schedule under other pay items. This includes rock and boulder excavation.
- D. Borrow Excavation: Borrow excavation shall consist of excavation made from borrow areas within the limits of the project outside the normal grading limits, or from areas outside the project when specified.
- E. Unclassified Excavation and Embankment: Unclassified Excavation and Embankment shall consist of the excavation and disposal of all material, regardless of its nature, as well as the embankment and embankment material regardless of its source when complying with the requirements herein and with the project geotechnical report, necessary to complete the project as described within the project documents.
- F. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve, as outlined in the Geotechnical Report.
- G. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve, as outlined in the Geotechnical Report
- H. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve, as outlined in the Geotechnical Report

- I. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 3/4-inch sieve and at least 50% retained on the No. 16 sieve, such as pit run gravel or sand, or non-plastic soil excavated from the trench..
- J. Drainage Course: Narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 31 Section "Site Clearing."
- C. Protect and maintain erosion and sedimentation controls, which are specified in Division 31 Section "Site Clearing," during earthwork operations.
- D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.
- E. General
 - 1. The rough excavation shall be carried to the necessary depth to obtain the specified depth of subgrade densification shown on the plans. Likewise, on embankments, the depth of subgrade densification shall be as shown on the plans or specified. Should the Contractor, through negligence or other fault, excavate below the designated lines, he shall replace the excavation with approved materials, in an approved manner and condition, at his own expense. All excavating, moving, placing and depositing of all materials are subject to approval by the Engineer and the Engineer shall determine the suitability of material to be placed in embankments. All materials determined unsuitable shall be disposed of in waste areas or as directed. Topsoil and strippings shall not be used in fills or in subgrades but shall be handled and placed as specified.
 - 2. The Contractor shall inform and satisfy himself as to the character, quantity, and distribution of all material to be excavated. No payment will be made for any excavated material which is used for purposes other than those designated. All spoil areas shall be leveled to a uniform line and section and shall present a neat appearance before project acceptance.
 - 3. If existing pavement areas that will be left in place are damaged due to hauling or to any other activity of the Contractor, they shall be replaced at the Contractor's expense as directed by the Engineer. Those areas outside of the pavement area which are disturbed due to the Contractor's operations shall be restored to their original condition prior to final acceptance of the project.
 - 4. Spillage of excavation materials on paved areas shall be immediately cleaned up by the Contractor. Cleanup shall include brooming and flushing with water, by mechanical means.

5. If it is necessary to interrupt existing surface drainage, sewers or underdrainage, conduits, utilities, or similar underground structures, or parts thereof, the Contractor shall be responsible for and shall take all necessary precautions to protect and preserve or provide temporary services. When such facilities are encountered, the Contractor shall notify the Engineer, who shall arrange for their removal, if necessary. The Contractor shall, at his own expense, satisfactorily repair all damage to such facilities or structures which may result from any of his operations during the period of the contract.
6. Where remaining ends of abandoned pipes or portions of other items partially removed under this specification would be left exposed, removal shall be carried into the slope or below grade to furnish no evidence of their existence in the finish surface. Remaining ends of sewer pipes and conduits shall be capped or plugged in a watertight manner.

F. Contractor's responsibility for utility properties and services.

1. At points where the Contractor's operation could cause damage or interference to railway, telegraph, telephone, television, power, oil, gas, water, irrigation, or other private, public, or municipal utilities, the Contractor shall suspend work until all arrangements necessary for the protection thereof have been made by the Contractor.
2. The Contractor shall notify all utility offices which are affected by the construction operation at least 48 hours in advance of excavation. Under no circumstances shall the Contractor expose or interrupt any utility without first requesting permission and being granted to do so from the affected agency. It shall be the Contractor's responsibility, once permission from the utility has been granted, to locate, if necessary, and expose all of the existing underground utilities in advance of the trenching operation.
3. The Contractor shall be solely and directly responsible to the Owner and utility companies for any damage, expense, or claims of any kind brought because of injuries, damages or delay which may result from the carrying out of the work to be done under the Contract.
4. In the event of interruption to domestic water or to other utility services as a result of accidental breakage, or as a result of being exposed, unsupported, or a lack of coordination, the Contractor shall promptly notify the Engineer and the agency involved. The Contractor shall cooperate with the said authority in restoration of services as promptly as possible and shall bear any and all costs of repairs. In no case shall interruption of any water or utility service be allowed to exist outside working hours unless prior to approval of the Engineer or agency involved is granted.
5. Neither the Owner nor its officers or agents shall be responsible to the Contractor for damages as a result of the location of the underground utilities being other than that shown on the plans or for the existence of underground utilities not shown on the plans.

3.2 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
 2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:

- a. 24 inches outside of concrete forms other than at footings.
- b. 12 inches outside of concrete forms at footings.
- c. 6 inches outside of minimum required dimensions of concrete cast against grade.
- d. 6 inches beneath bottom of concrete slabs on grade.

B. Classified Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Architect. The Contract Sum will be adjusted for rock excavation according to unit prices included in the Contract Documents. Changes in the Contract time may be authorized for rock excavation.

1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and other materials not classified as rock or unauthorized excavation.

- a. Intermittent drilling; blasting, if permitted; ram hammering; or ripping of material not classified as rock excavation is earth excavation.

3.3 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.4 SUBGRADE INSPECTION

A. Notify Architect when excavations have reached required subgrade.

B. If Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction. Limit vehicle speed to 3 mph.
2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.5 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.

1. Fill unauthorized excavations under other construction or utility pipe as directed by Architect.

3.6 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
- B. Location of Excavated Materials: During excavation the Contractor shall locate excavated material so as not to block any public right-of-way, traveled roadways, public or private; and unless otherwise approved by the Engineer, roadway shall be kept open to at least one lane of traffic. The Contractor shall store or waste excavated materials only in designated areas unless otherwise approved by the Engineer. Utmost care shall be taken to prevent spillage or damage to property adjacent to the project.

3.7 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for Record Documents.
 - 3. Testing and inspecting underground utilities.
 - 4. Removing concrete formwork.
 - 5. Removing trash and debris.
 - 6. Removing temporary shoring and bracing, and sheeting.
 - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.8 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 - 1. Under grass and planted areas, use satisfactory soil material.
 - 2. Under walks and pavements, use satisfactory soil material.
 - 3. Under steps and ramps, use engineered fill.
 - 4. Under building slabs, use engineered fill.
 - 5. Under footings and foundations, use engineered fill.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.
- D. Immediately prior to the placing of the fill materials, the entire area upon which the embankment is to be placed, except where limited by rock, shall be scarified and broken by means of a disc harrow or plow, or other approved equipment, to a depth of six inches. Scarifying shall be done approximately parallel to the axis of the fill. All roots, debris, large stone, or objectionable material that would cause interference with the compaction of the foundation or fill shall be removed from the area and disposed of as specified.

- E. The grading operations shall be conducted, and the various soil strata placed, to produce a soil structure as shown on the typical cross section or as specified. All materials entering the embankment shall be reasonably free of organic matter such as leaves, grass, roots and other objectionable material. Soil, granular material, and any other material permitted for use in embankment shall be spread in successive layers as specified.
- F. Operations on earth work shall be suspended at any time when satisfactory results cannot be obtained because of rain, freezing weather, or other unsatisfactory conditions of the field. The Contractor shall drag, blade, or slope the embankment to provide proper surface drainage.
- G. The material in the layers shall be of the proper moisture content before rolling to obtain the prescribed compaction. Wetting or drying of the material and manipulation when necessary to secure a uniform moisture content throughout the layer shall be required. Should the material be too wet to permit proper compaction or rolling, all work on all portions of the embankment thus affected shall be delayed until the material has dried to the required moisture content. Sprinkling shall be done and approved equipment that will sufficiently distribute the water. Sufficient equipment to furnish the required water shall be available at all times. Samples of all embankment materials for testing, both before and after placement and compaction, will be taken at frequent intervals. From these test, corrections, adjustments and modifications of methods, materials, and moisture content shall be made to construct the embankment.
- H. During construction of the embankment, the contractor shall route his equipment at all times, both when loaded and when empty, over the layers as they are placed and shall distribute the travel evenly over the entire width of the embankment. The equipment shall be operated in such a manner that cemented gravel or other chunky soil material will be broken up into small particles and become incorporated with the other material in the layer.
- I. In the construction of embankments, starting layers shall be placed in the deepest portion of the fill; as placement progresses, layers shall be constructed approximately parallel to the finished pavement grade line.
- J. When rock and other embankment materials are excavated at approximately the same time, the rock shall be incorporated into the outer portion of the embankment and the other material shall be incorporated under the future paved areas. Stones or fragmentary rock larger than eight (8) inches in their greatest dimension will not be allowed in the top one (1) foot of the subgrade. Rock fill shall be brought up on layers as specified or as directed and every effort shall be exerted to fill the voids with the finer material to form a dense, compact mass. Rocks or boulders shall not be disposed of outside the excavation or embankment areas, except at places and in the manner designed by the Engineer.
- K. Where embankments are constructed predominately of rock fragments, the thickness of layers shall be as the Engineer may direct, but not greater than 18 inches. All voids between rocks, boulders, etc. shall be filled with earth material brought to optimum moisture content and compacted as specified.
- L. If in the opinion of the Engineer, the material is unstable, rolling shall continue until the embankment is stable.
- M. The Contractor shall be responsible for the stability of all embankments made under the contract and shall replace any portion, which, in the opinion of the Engineer, has become displaced due to carelessness or negligence on the part of the Contractor.

3.9 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.10 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:
 - 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent, as outlined in the Geotechnical Report.
 - 2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent, as outlined in the Geotechnical Report.
 - 3. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent, as outlined in the Geotechnical Report.

3.11 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus 1 inch
 - 2. Walks: Plus or minus 1 inch
 - 3. Pavements: Plus or minus 1/2 inch
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.12 SUBBASE AND BASE COURSES

- A. Place subbase course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course under pavements and walks as follows:
 - 1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
 - 2. Place base course material over subbase course under hot-mix asphalt pavement.
 - 3. Shape subbase course to required crown elevations and cross-slope grades.
 - 4. Place subbase course 6 inches or less in compacted thickness in a single layer.
 - 5. Place subbase course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 - 6. Compact subbase course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557, as outlined in the Geotechnical Report.
- C. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry unit weight according to ASTM D 1557, as outlined in the Geotechnical Report.

3.13 DRAINAGE COURSE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:
 - 1. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
 - 2. Place drainage course 6 inches or less in compacted thickness in a single layer.
 - 3. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 - 4. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 1557, as outlined in the Geotechnical Report.

3.14 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

- D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
 - 1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than 3 tests.
- E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.15 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.16 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.
- B. Disposal: Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Architect.
 - 1. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

3.17 FINISHING:

- A. Work under this specification is to be done after the earthwork has been substantially completed and will involve any or all of the following items of work as may be applicable or pertinent.
- B. All side slopes in excavation and fills shall be trimmed and shaped as specified herein and shall be made free of all exposed roots and debris and of all stones exceeding two (2) inches in size which are loose or liable to become loosened. Embankments need not be finished to a fine degree of perfection, but shall be made as smooth, safe and sightly as practicable with the compatibility of materials used in construction of the embankments. If directed by the Engineer,

embankment slopes flatter than four to one and constructed of rocky material shall be covered with a layer of earth, talus or other fine material

- C. In the vicinity of bridge ends, culvert ends, inlets, walls, etc., all extraneous matter shall be removed and the areas shaped and trimmed as directed. All sewers, culverts, drains and their appurtenances constructed under the contract shall be cleaned out.
- D. All materials removed in connection with the above operations shall be disposed of in a manner satisfactory to the Engineer.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Hot-mix asphalt patching.
2. Hot-mix asphalt paving.
3. Pavement-marking paint.

- B. Related Sections:

1. Division 31 Section "Earth Moving" for aggregate subbase and base courses and for aggregate pavement shoulders.
2. Division 32 Sections for other paving installed as part of crosswalks in asphalt pavement areas.

1.3 UNIT PRICES

- A. Work of this Section is affected by ton.

1.4 DEFINITION

- A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definitions of terms.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

1. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
2. Job-Mix Designs: For each job mix proposed for the Work.

- B. Shop Drawings: Indicate pavement markings, lane separations, and defined parking spaces. Indicate, with international symbol of accessibility, spaces allocated for people with disabilities.

- C. Material Certificates: For each paving material, from manufacturer.

- D. Material Test Reports: For each paving material.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.
- B. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
 - 1. Tack Coat: Minimum surface temperature of 60 deg F.
 - 2. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
 - 3. Asphalt Surface Course: Minimum surface temperature of 60 deg F and rising at time of placement.
- B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F and rising for oil-based materials and 55 deg F and rising for water-based materials, and not exceeding 95 deg F.

PART 2 - PRODUCTS

2.1 AGGREGATES

- A. General: Use materials and gradations that have performed satisfactorily in previous installations.
- B. Coarse Aggregate: ASTM D 692, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.
- C. Fine Aggregate: ASTM D 1073 sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.
 - 1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.
- D. Mineral Filler: ASTM D 242 rock or slag dust, hydraulic cement, or other inert material.

2.2 ASPHALT MATERIALS

- A. Asphalt Binder: AASHTO M 320.
- B. Asphalt Cement: ASTM D 3381 for viscosity-graded material.
- C. Prime Coat: ASTM D 2027, medium-curing cutback asphalt.

- D. Prime Coat: Asphalt emulsion prime coat complying with Oregon DOT requirements.
- E. Tack Coat: ASTM D 977 emulsified asphalt, or ASTM D 2397 cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.
- F. Water: Potable.
- G. Undersealing Asphalt: ASTM D 3141, pumping consistency.

2.3 AUXILIARY MATERIALS

- A. Sand: ASTM D 1073, Grade Nos. 2 or 3.
- B. Joint Sealant: ASTM D 6690, hot-applied, single-component, polymer-modified bituminous sealant.
- C. Pavement-Marking Paint: Alkyd-resin type, lead and chromate free, ready mixed, complying with AASHTO M 248; colors complying with FS TT-P-1952.
 - 1. Color: As indicated.
 - 2. Pavement-Marking Paint: MPI #32 Alkyd Traffic Marking Paint.
- D. Pavement-Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952, Type II, with drying time of less than 45 minutes.
 - 1. Color: As indicated.

2.4 MIXES

- A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by City of Tigard and complying with the following requirements:
 - 1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
 - 2. Base Course: Class B
 - 3. Surface Course: Class B
- B. Emulsified-Asphalt Slurry: ASTM D 3910, Type 3.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that subgrade is dry and in suitable condition to begin paving.
- B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.
- C. Proceed with paving only after unsatisfactory conditions have been corrected.
 - D. Verify that utilities and other items requiring a cut and installation beneath the asphalt surface have been completed and that asphalt surface has been repaired flush with adjacent asphalt prior to beginning installation of imprinted asphalt.

3.2 PATCHING

- A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.
- B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.15 gal./sq. yd..
 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.
- C. Patching: Fill excavated pavements with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.
- D. Patching: Partially fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.

3.3 REPAIRS

- A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch in existing pavements.
 1. Install leveling wedges in compacted lifts not exceeding 3 inches thick.
- B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch.
 1. Clean cracks and joints in existing hot-mix asphalt pavement.
 2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.
 3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.

3.4 SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

- B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.
 - 1. Mix herbicide with prime coat if formulated by manufacturer for that purpose.
- C. Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.15 to 0.50 gal./sq. yd.. Apply enough material to penetrate and seal but not flood surface. Allow prime coat to cure.
 - 1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
 - 2. Protect primed substrate from damage until ready to receive paving.
- D. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd..
 - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.5 HOT-MIX ASPHALT PLACING

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
 - 1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
 - 2. Place hot-mix asphalt surface course in single lift.
 - 3. Spread mix at minimum temperature of 250 deg F.
 - 4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
 - 5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
- B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.
 - 1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.6 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
 - 1. Complete compaction before mix temperature cools to 185 deg F.
- B. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- C. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
- D. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- E. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

3.7 INSTALLATION TOLERANCES

- A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:
 - 1. Base Course: Plus or minus 1/2 inch.
 - 2. Surface Course: Plus 1/4 inch, no minus.

3.8 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.
- B. Sweep and clean surface to eliminate loose material and dust.
- C. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.
- C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

- D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D 979.
 - 1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
 - 2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.
 - a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than 3 cores taken.
 - b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.
- E. Replace and compact hot-mix asphalt where core tests were taken.
- F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.10 DISPOSAL

- A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.
 - 1. Do not allow milled materials to accumulate on-site.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes exterior cement concrete pavement for the following:
 - 1. Curbs and gutters.
 - 2. Walkways.
- B. Related Sections include the following:
 - 1. Division 31 Section "Earth Moving" for subgrade preparation, grading, and subbase course.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.4 SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:
 - 1. Cementitious materials.
 - 2. Admixtures.
 - 3. Curing compounds.
 - 4. Applied finish materials.
 - 5. Bonding agent or epoxy adhesive.
 - 6. Joint fillers.
- D. Field quality-control test reports.
- E. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

- A. **Manufacturer Qualifications:** Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. **Testing Agency Qualifications:** An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
- C. **ACI Publications:** Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.
- D. **Concrete Testing Service:** Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- E. **Preinstallation Conference:** Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."
 - 1. Before submitting design mixtures, review concrete pavement mixture design and examine procedures for ensuring quality of concrete materials and concrete pavement construction practices. Require representatives, including the following, of each entity directly concerned with concrete pavement, to attend conference:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete producer.
 - d. Concrete pavement subcontractor.

1.6 PROJECT CONDITIONS

- A. **Traffic Control:** Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. **Available Products:** Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 - 2. **Products:** Subject to compliance with requirements, provide one of the products specified.

3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
 1. Use flexible or curved forms for curves with a radius 100 feet or less.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use one of the following cementitious materials, of the same type, brand, and source throughout the Project:
 1. Portland Cement: ASTM C 150
 - a. Fly Ash: ASTM C 618.
 - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- B. Normal-Weight Aggregates: ASTM C 33, coarse aggregate, uniformly graded. Provide aggregates from a single source.
 1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.4 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

1. Available Products:

- a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
- b. Burke by Edoko; Aqua Resin Cure.
- c. ChemMasters; Safe-Cure Clear.
- d. Conspec Marketing & Manufacturing Co., Inc.; W.B. Resin Cure.
- e. Dayton Superior Corporation; Day Chem Rez Cure (J-11-W).
- f. Euclid Chemical Company (The); Kurez DR VOX.
- g. Kaufman Products, Inc.; Thinfilm 420.
- h. Lambert Corporation; Aqua Kure-Clear.
- i. L&M Construction Chemicals, Inc.; L&M Cure R.
- j. Meadows, W. R., Inc.; 1100 Clear.
- k. Nox-Crete Products Group, Kinsman Corporation; Resin Cure E.
- l. Symons Corporation; Resi-Chem Clear.
- m. Tamms Industries Inc.; Horncure WB 30.
- n. Unitex; Hydro Cure 309.
- o. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.

- E. White Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B.

1. Available Products:

- a. Anti-Hydro International, Inc.; AH Curing Compound #2 WP WB.
- b. Burke by Edoco; Resin Emulsion White.
- c. ChemMasters; Safe-Cure 2000.
- d. Conspec Marketing & Manufacturing Co., Inc.; W.B. Resin Cure.
- e. Dayton Superior Corporation; Day-Chem White Pigmented Cure (J-10-W).
- f. Euclid Chemical Company (The); Kurez VOX White Pigmented.
- g. Kaufman Products, Inc.; Thinfilm 450.
- h. Lambert Corporation; Aqua Kure-White.
- i. L&M Construction Chemicals, Inc.; L&M Cure R-2.
- j. Meadows, W. R., Inc.; 1200-White.
- k. Symons Corporation; Resi-Chem White.
- l. Tamms Industries, Inc.; Horncure 200-W.
- m. Unitex; Hydro White.
- n. Vexcon Chemicals, Inc.; Certi-Vex Enviocure White 100.

2.5 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

- B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- C. Chemical Surface Retarder: Water-soluble, liquid-set retarder with color dye, for horizontal concrete surface application, capable of temporarily delaying final hardening of concrete to a depth of 1/8 to 1/4 inch .
 - 1. Available Products:
 - a. Burke by Edeco; True Etch Surface Retarder.
 - b. ChemMasters; Exposee.
 - c. Conspec Marketing & Manufacturing Co., Inc.; Delay S.
 - d. Euclid Chemical Company (The); Surface Retarder S.
 - e. Kaufman Products, Inc.; Expose.
 - f. Metalcrete Industries; Surfard.
 - g. Nox-Crete Products Group, Kinsman Corporation; Crete-Nox TA.
 - h. Scofield, L. M. Company; Lithotex.
 - i. Sika Corporation, Inc.; Rugasol-S.
 - j. Vexcon Chemicals, Inc.; Certi-Vex Envioset.
- D. Rock Salt: Sodium chloride crystals, kiln dried, coarse gradation with 100 percent passing 3/8-inch sieve and 85 percent retained on a No. 8 sieve.

2.6 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.
- B. Proportion mixtures to provide normal-weight concrete with the following properties:
 - 1. Compressive Strength (28 Days): 3000 psi.
 - 2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.
 - 3. Slump Limit: 5 inches plus or minus 1 inch .
- C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
 - 1. Air Content: 3-1/2 percent plus or minus 1.5 percent for 3/4-inch nominal maximum aggregate size.
- D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

2.7 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.
 1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.
 1. Continue steel reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
 2. Provide tie bars at sides of pavement strips where indicated.
 3. Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 4. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
1. Locate expansion joints at intervals of 25 feet, unless otherwise indicated.
 2. Extend joint fillers full width and depth of joint.
 3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
 4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows to match jointing of existing adjacent concrete pavement:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 3/8-inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
 3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.
- E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 3/8-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.5 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at Project site.
- F. Do not add water to fresh concrete after testing.

- G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
 - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.
- H. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.
 - 1. Remove and replace concrete that has been placed for more than 15 minutes without being covered by top layer, or use bonding agent if approved by Architect.
- I. Screed pavement surfaces with a straightedge and strike off.
- J. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.
- K. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mix designs.
- L. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:
 - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 - 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.6 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Rfloat surface immediately to uniform granular texture.

1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.
2. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.
3. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.

3.7 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
 1. Moist Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.8 PAVEMENT TOLERANCES

- A. Comply with tolerances of ACI 117 and as follows:
 1. Elevation: 1/4 inch..

2. Thickness: Plus 3/8 inch, minus 1/4 inch.
3. Surface: Gap below 10-foot- long, unlevelled straightedge not to exceed 1/4 inch.
4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.
5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.
6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.
8. Joint Spacing: 3 inches.
9. Contraction Joint Depth: Plus 1/4 inch, no minus.
10. Joint Width: Plus 1/8 inch, no minus.

3.9 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.
- B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.
- C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION

